BULLETIN

No. 44

THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY

BULLETIN No. 44

ISSUED BY
THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY, INC.
BAKER LIBRARY, HARVARD BUSINESS SCHOOL
BOSTON, MASSACHUSETTS

October, 1937

Price for Members $1.00 *Price for Non-members $2.00*

Table of Contents

Fisher Transportation
20-39

Officers and Directors of the Railway and Locomotive Historical Society, Inc.

CHAS. E. FISHER, *President*
51 Newbury St., Newton Centre, Mass.

SIDNEY WITHINGTON, *Vice President*
7 Briar Lane, New Haven, Ct.

WARREN JACOBS, *Secretary*
South Station, Boston, Mass.

HAROLD S. WALKER, *Assistant Secretary*
P. O. Box #65, Beach Bluff, Mass.

GEO. P. BECKER, *Treasurer*
96 Avon Hill St., Cambridge, Mass.

JOHN W. MERRILL, *Curator*
40 Broad St., Boston, Mass.

W. R. FOGG, *Director*
26 Monadnock St., Boston, Mass.

EDWARD HUNGERFORD, *Director*
230 Park Ave., New York, N. Y.

A. SHELDON PENNOYER, *Director*
114 East 66th St., New York, N. Y.

G. W. BISHOP, *Resident European Director*
12 Queen's Road, Kenilworth, Warwickshire, England

D. L. JOSLYN, *Resident Western Director*
2164 Castro Way, Sacramento, Calif.

PROF. EDWARD C. SCHMIDT, *Mid-Western Representative*
905 West California Ave., Urbana, Illinois

GILBERT H. KNEISS, *Pacific Coast Representative*
18 Forest Lane, Berkeley, Cal.

ROBERT R. BROWN, *Eastern Canadian Representative*
700 St. Catherine St., West, Montreal, P. Q., Canada

NORMAN THOMPSON, *Western Canadian Representative*
Box No. 2004, Winnipeg, Manitoba, Canada

D. S. BARRIE, *British Representative*
62 Longland Drive, Totteridge, N. 20, London, England

CARLTON PARKER, *Exchange Manager*
45 Warren St., Newton Center, Mass.

ROBERT C. SCHMID, *Secretary*, New York Chapter
P. O. Box No. 434, Grand Central Annex, New York, N. Y.

D. W. YUNGMEYER, *Secretary*, Chicago Chapter
5116 Dorchester Ave., Chicago, Illinois.

STANLEY F. MERRITT, *Secretary, Pacific Coast Chapter*
836 Alma Ave., Oakland, California

The Railway and Locomotive Historical Society, INC.

COMMITTEE IN CHARGE OF PUBLICATIONS.

In presenting this bulletin to our members which is considerably larger than our past editions we are calling your attention to the article reprinted from *The Pennsylvania Magazine*. The reminiscences of Mr. Solomon W. Roberts, who helped build the old Portage R. R. are of great interest and value and the construction and operation of this early line will be of unusual interest to our members. To the member who loaned the volume containing this article and who was thoughtful enough to send it in, the Editor wishes to express his appreciation.

We also welcome to our columns Mr. Charles G. Woodward who has written an interesting account of the South-Western Railway and we also want to thank Mr. Walter Lucas for calling our attention to the fact that it was one hundred years ago this month that Rogers, Ketchum & Grosvenor completed their first engine, the "Sandusky," and sent in an interesting account of its trial. Mr. Lawrence Breed Walker has favored us with an interesting account of the Billerica & Bedford R. R., the first two foot gauge road constructed in this country. These and the other articles make up your "manifest" for your fall bulletin and the Editor hopes that you will find them all of interest and value.

The summer, usually a time when your Editor has a chance to take a brief rest from the publications of this Society, has been unusually

active. As announced in Bulletin No. 43, two extra publications would appear. Part II of the Locomotives of the Chicago, Burlington & Quincy R. R., 1855-1904 was ready for distribution in July. The Railroads of Wisconsin, a masterly treatise by James P. Kaysen was ready in August. Both of these publications have aroused more than passing interest and our supply of this limited edition is rapidly diminishing. We urge our members to procure their copies now before it is too late.

Last but by no means least, the Directors of this Society extend a cordial welcome to our newly formed Pacific Coast Chapter. Authority for the formation of this chapter was authorized by our Secretary, Warren Jacobs, on July 8th, 1937. Subsequent to this authorization the following officers of the Chapter were elected: Mr. Gilbert H. Kneiss, Chairman; Mr. Gerald M. Best, Vice Chairman and Mr. Stanley F. Merritt, Secretary and Treasurer. Already these officers and our chapter members have embarked upon plans to arouse an interest in the historic on the Pacific Coast and they have our support and best wishes from the entire Society.

New England's Railroads

Prof. George Pierce Baker of the Harvard Business School chose this as the subject of his thesis for his Doctor's degree. It was the concensus of opinion of Prof. Cunningham, Dr. Cole and your Editor that this thesis should be published in book form. Again the Harvard Business School has joined with this Society in the matter of a joint publication and the Harvard University Press expects to have this book ready by the end of the year.

Prof. Baker needs no introduction to those of us who live in the vicinity of Boston or who have heard him address a meeting. He is intensely interested in the subject of railroads and is, therefore, a member of this Society.

In preparing his thesis, it was Prof. Baker's intention to treat only of the economic aspect of the subject. In his examination of the Annual Reports and the material on file in the Baker Library he was so impressed and interested with the historic that he decided to include that as well. The book will treat of the conception and growth of our New England roads up to their present formation—1900. For the first time, the history of our larger New England roads will be included within the covers of one book. For the first time will be shown the interrelationship of the small lines and branches not only with the parent road but with the competitors. You have the positive assurance of your Editor that this book is decidedly worth while and that it is far more interesting than the "best seller."

A sufficient number of copies have been reserved for the use of the members of this Society. At the time the book is ready for distribution a notice will be forwarded you. The price will not be over $3.50 and here is your chance for the wife to make you a fine Christmas present if you will only hint hard enough.

Reminiscences of the First Railroad over The Allegheny Mountain

Read before the Historical Society of Pennsylvania April 8, 1878

(Reprinted from The Pennsylvania Magazine, Vol. II, No. 4.)

By SOLOMON W. ROBERTS, *Civil Engineer*

THE following reminiscences of the First Railroad over the Allegheny Mountain, have been prepared at the request of the Council of the Historical Society of Pennsylvania.

They relate to the Portage Railroad; the building of which was begun by the State in the year 1831; which was opened for use as a public highway in 1834; and was an important thoroughfare for about twenty years, until it was superseded by the opening of a railroad without inclined planes.

As the Portage Railroad was considered for years to be a great triumph of civil engineering, and as it has ceased to exist, I embrace this opportunity to give my recollections of its construction, having been employed upon the line, in the service of the State.

The undertaking of an extensive system of internal improvements at the expense of the Commonwealth, was an event of no small importance in the history of Pennsylvania. An account of this great enterprise, which increased the State debt to about forty millions of dollars, has never been adequately written. The high hopes with which the work was begun; the large premiums at which the five per cent. loans of the State were for a time sold; the great revulsion of feeling, and the fall of prices, which caused the loans to sell at one time for about thirty-three cents on the dollar; the subsequent sale of the public works to corporations, and the complete recovery of the State credit, are facts well worthy of remembrance.

The geographical position of Pennsylvania, so often called "the Keystone State," is peculiar and remarkable. Washed on its southeastern border by the Atlantic tides, it extends on the northwest to the shore of Lake Erie, and includes, in Allegheny County, the head of the Ohio River. Various lines of internal improvement were proposed in the early history of Pennsylvania, but the rugged topography of much of its territory delayed their execution.

The level character of the country between Albany and Buffalo, enabled New York to construct the Erie Canal, which was opened for use in October, 1825. This stimulated similar action on the part of the legislature of this State, and the Pennsylvania Canal was begun on the 4th of July, 1826.

In the following year I entered the service of the Lehigh Coal and Navigation Company. A native of Philadelphia and educated in Friends' Academy, I witnessed the construction and opening of the Mauch Chunk

Railroad in 1827, and of the Lehigh Canal, which was opened from Mauch Chunk to Easton in 1829, having been employed as rodman and leveller on fifteen miles of the canal. For more than two years I lived in the house of my uncle, Josiah White, who was then acting manager of the company, and had the advantage of receiving instruction from that able, practical engineer; and, in the engineer corps on the canal, I received scientific and technical training under those masters of the profession; Canvass White and Sylvester Welch, who had been employed on the Erie Canal.

When the work on the Lehigh was done, in the autumn of 1829, Sylvester Welch was employed by the State of Pennsylvania as principal engineer of the Western Division of the Pennsylvania Canal, and removed to Blairsville, on the Conemaugh, to which place I accompanied him. The canal was then nearly completed from Pittsburgh to Blairsville, and was in progress from Blairsville to Johnstown. Much of the work was badly done, and was not strong enough to withstand the occasional floods to which it was exposed. The Canal Commissioners were politicians, there was great competition for contracts, and work contracted for at low prices often failed to endure the strains to which it was subjected; the laws of nature having no respect for political parties. We struggled on with the work, and the canal was opened to Johnstown, at the western base of the Allegheny Mountain, in December, 1830. On my division, there was an aqueduct across the Conemaugh River at Lockport, having five arches, each of sixty feet span, built of cut stone.

My intimate friend and colleague in this arduous and thankless service, was the late Edward Miller, civil engineer, afterwards so well known for his great intelligence, and for his high character as a Christian gentleman. The pay that we received from the State was two dollars per day, for the time actually employed, and we paid our own expenses.

The canal being done from Pittsburgh to Johnstown, I returned to my father's home in Philadelphia, on the 23rd of January, 1831, far from being pleased with the general results of my experience on the canal in the valley of the Conemaugh.

At that time there was much discussion as to the best mode of crossing the Allegheny Mountains, so as to form a connection between the canals on its eastern and western sides.

Some surveys had been made for a continuous canal, both by the Juniata route and by the West Branch of the Susquehanna; but the natural obstacles were too great, and the scheme was given up. Several lines for a railroad had also been run, and inclined planes of different kinds proposed.

On the 21st of March, 1831, the law was passed authorizing the Board of Canal Commissioners to commence the construction of a Portage Railroad over the Allegheny Mountain. The Board appointed Sylvester Welch, the principal engineer of the western division of the Pennsylvania Canal, to the same position in the building of the Portage Railroad, and he nominated me as his assistant. Mr. Welch was an elder brother of Ashbel Welsh, the distinguished civil engineer of New

Jersey. Sylvester Welsh was a man of great ability and integrity, and of untiring industry, as I who was one of his assistants for more than eight years can testify. At his request I joined him at Blairsville, and on the 5th of April, by a resolution of the Board of Canal Commissioners, I was appointed to my position, being then in the twentieth year of my age.

On the 8th of April, 1831, just 47 years ago, we began our explorations near the summit of the mountain. The weather was cold, stormy, and unfavorable; there was much snow on the mountain; and I remember particularly that on the evening of the first day, the wind was so high as to blow heavy pieces of bark from the bodies of dead hemlock trees.

On the 12th of April, our party of sixteen persons went into camp near the head of the mountain branch of the Conemaugh, and we began to locate the railroad. We had tents owned by the State, and four of us slept on buffalo robes, in what had been used as a surgeon's tent; and to my surprise I did not take cold. It had been intended that another engineer, older than myself, should lead the locating party; but his health failed before the work was begun, and he had to retire. The country was very rough, and the running of the line much obstructed by fallen timber.

The general character of the country had been ascertained from the results of former surveys, made by Mr. Moncure Robinson, Colonel Long, and other engineers. It was known that the distance over the Allegheny Mountain, from Hollidaysburg to Johnstown, was about thirty-six miles, and that the summit at Blair's Gap was about 1400 feet above Hollidaysburg, and 1200 feet above Johnstown. The eastern slope of the mountain is much steeper than the western. The slates and sandstones of the bituminous coal measures dip into the mountain on its eastern slope, and show the broken ends of the strata, as if an immense wedge had been driven, in a northwesterly direction, under that part of the earth's crust. At the head of one of the inclined planes on the eastern slope, a well was bored 712 feet deep, without finding water. The western slope of the mountain is comparatively gentle, and the stratification flattens out as it approaches Johnstown.

Modern railroads were in their infancy when this work was begun, and the powerful locomotives that now draw heavy loads up high grades had no existence. It was in October, 1829, about eighteen months before, that the little engine, called "the Rocket," the first one built on the modern plan, was tried on the Liverpool and Manchester Railroad. The combination of the tubular boiler with the blast pipe in the chimney was the cause of its success.

The general design for the Portage Railroad was this: The principal part of the elevation was to be overcome by inclined planes, which were to be straight in plan and profile; to be on an average somewhat less than half a mile long; and to have an angle of elevation of about five degrees, or about the same as moderately steep hills on turnpike roads; so that the average height overcome by each plane might be about 200 feet. These planes to be worked by stationary steam engines and endless ropes.

As ultimately constructed there were ten inclined planes, five on each side of the mountain; and their whole length was four miles and four-tenths, with an aggregate elevation of 2007 feet. Their angles of inclination ranged from four degrees and nine minutes to five degrees and fifty-one minutes. The railroad between the planes was located with very moderate grades, and the minimum radius of curvature was about 442 feet, but only a small proportion of the curvature had a less radius than 955 feet. The gauge, or width of track, was four feet nine inches.

In locating the line, our levelling instruments were good, as perfect levelling had been required on the canals, where water tested the work; but our instruments for running curves were poor, and the work was done mostly with a surveyor's compass. At that time the importance of straightness on a railroad was not adequately appreciated.

When the weather became warmer we were annoyed by multitudes of gnats, and resorted to the smoke of burning leaves to mitigate the evil. We also tried greasing our faces to keep the insects from biting them. It occurred to me that this might be one of the reasons why Indians often paint their faces.

Rattlesnakes were numerous and of course dangerous, but none of us were bitten by them. They are usually sluggish reptiles, and will let man alone if they are not trodden on or attacked. They also give warning with their rattles before they strike. Our axmen made a collection of live rattlesnakes, and kept them in a box. They are easily caught by an expert hand. To the end of a stick about four feet long, a short piece of strong twine was tied. So as to form a slip knot. The snake when defending itself, would lie partly coiled on the ground, or on a rock, with the rattles on its tail at the outside of the coil, and its head upraised in the middle. The man approaching with the stick would slip the loop of the twine over the snake's head, and round its neck; and, by giving a little jerk, would draw the slip knot tight, and lift the snake from the ground. The snake would then writhe in vain, and would be powerless to strike. To carry it to camp, it was put into the tube made of the bark of a sapling, or small tree, peeled off for the purpose, which was readily done by an expert woodsman. Catching snakes was the amusement of our men, and eating maple sugar our luxury. I remember that George Wolf, then Governor of Pennsylvania, visited our camp while we had the box of snakes.

When we reached the Horse-shoe-bend of the Conemaugh, about eight miles from Johnstown, I was in charge of the locating party. The line was made to cross the stream, and cut across the bend, so as to save distance, which made a high bridge necessary. The Horse-shoe-bend; or Conemaugh viaduct, is still standing, and is used by the Pennsylvania Railroad Company as a part of its main line; and it is I believe almost the only structure of the old Portage Railroad now in use. It is a substantial and imposing piece of masonry, about seventy feet high, and with a semi-circular arch of eighty feet span. The chief engineer had prepared a plan for a bridge of two arches, each of fifty feet span, but afterwards adopted the plan of the present structure. It was designed, and its

erection superintended by me, and the work was done by an honest Scotch stone-mason, named John Durno, who was afterwards killed by falling from another high bridge. The arch is three and a half feet thick at the springing line, and three feet at the crown; the arch stones are of light-colored sandstone, and the backing of silicious limestone, found near the spot. The sandstone was split from erratic blocks, often of great size, which were found lying in the woods, on the surface of the ground. The contract price for the masonry was $4.20 per perch of twenty-five cubic feet, and the work was remarkably well done. The face stones were laid in mortar from the silicious limestone, without the addition of any sand.

The cost of the viaduct was about forty-five thousand dollars, and by building it a lateral bend of about two miles was avoided. The embankment at the end of the viaduct was sixty-four feet high. Since that work was done, iron bridges have taken the place of such structures. At the staple bend of the Conemaugh, four miles from Johnstown, a tunnel was made through a spur of the Allegheny, near which the stream makes a bend of two miles and one half. The length of the tunnel was 901 feet, and it was twenty feet wide, and 19 feet high within the arch; 150 feet at each end being arched with cut stone. Its cost was about $37,500. This was the first railroad tunnel in the United States. Inclined plane No. 1, being the plane nearest to Johnstown, was located at the western end of the tunnel. The western terminus of the Portage Railroad, at the canal basin at Johnstown, 21 miles from the starting point, was located on the 14th of May.

Johnstown, in Cambria County, is now a large town, and the seat of the great Cambria Iron Works. When I first saw the place, it was a very quiet village, with tall elder bushes growing in the streets. It had first been called Conemaugh, and I remember to have seen the original plan of the place, with its title marked: "The town of Conemaugh, the only port for boating on the western waters, east of the Laurel Hill," It had been practicable, at times of high water, to run rafts and small flat boats from there to Pittsburgh.

W. Milnor Roberts joined the engineering corps in the month of May, as principal assistant, and located the eastern portion of the Portage Railroad, from the point where we began, over the summit of the Allegheny Mountain, and down to Hollidaysburg, a distance of about sixteen miles; which included the steep eastern slope of the mountain, and most of the inclined planes. He has since distinguished himself as the engineer of many important works, and continues to be one of my most intimate friends, as he has been since we were together in the engineer corps on the Lehigh in 1827.

Proposals from contractors having been invited, the grading and masonry of the twenty-six miles from the summit of the mountain to Johnstown, were contracted for at Ebensburg, the county seat of Cambria County, on the 25th of May, and the work on the eastern slope of the mountain, at Hollidaysburg, on the 29th of July, 1831. It was determined to grade the road at once for a double track, and to build all the bridges and culverts of stone. There was no wooden bridge upon

the line. In the case of one small bridge of two spans, which had to be built at an oblique angle, I proposed an iron superstructure, but the plan was not approved.

The principal office was established at Ebensburg, although it was several miles from the railroad, because it was on the turnpike, and readily accessible. Before our office windows the Conestoga wagons loaded with emigrants, with their baggage and furniture, slowly wended their way to the West.

We had to travel on foot along the line of the work, and very bad travelling it was for a long time. A large part of the line ran through a forest of heavy spruce or hemlock timber, many of the trees being over 100 feet high; through this a space 120 feet wide was cleared, which was difficult work. Immense fires were made, but the green timber did not burn well, and many of the trees were rolled down the mountain slopes, and left to decay.

In looking back at the location that was thus made about forty-seven years ago, it appears to me that it was about as well done as could be expected, under the circumstances as they then existed. Railroad construction was a new business, and much had to be learned from actual trial; but it was known at the time, that the location was too much hurried, which arose from the great impatience of the public. A good deal of curvature might have been saved by a careful revision of the line; but the reduction of the height of the summit by a tunnel, as has since been done, the legislature had refused to permit.

After the grading and masonry of the Portage Railroad was put under contract, the line was divided; and the western half being in my charge, and the eastern in charge of my friend, W. Milnor Roberts. The work was pushed forward with energy, a force of about two thousand men being at one time employed upon it.

Whilst our office was in Ebensburg, which was for about a year, the most noted person in the neighborhood was the Rev. Dr. Demetrius Augustine Gallitzen, whom I well remember. The summit station on the Pennsylvania Railroad is named after him. He called himself Parish Priest of Loretto and Vicar-General. He was a Russian nobleman, born in 1770, and he left the Greek Church, and became a zealous Roman Catholic Missionary. He founded the town of Loretto near Ebensburg, and died there in 1840. He is believed to have expended about $150,000 at that place; but, having been deprived of his estate in Russia, he became poor. He was a small man, of an olive complexion, with very bright eyes, and I considered him to be the most perfect example of a religious enthusiast that I had ever seen. He was deservedly held in very high esteem for his self-denying earnestness. He spent much money in building a church at Loretto, and tried hard to make the rough people on the mountain behave as he wished, when they visited it. The country was very poor, and he became involved in debt, which troubled him much. It was currently reported, and I believe it to be true, that he had made a vow that he would not ride on horseback or in a carriage until his debts were paid, so that when his services were needed at a distance from home, he was sometimes hauled on a sled.

In 1831, my friend, Edward Miller, went to England to obtain the most recent information on the subject of railroads, and he returned about the close of that year. He was soon after appointed principal assistant engineer, in the service of the State, and was given the charge of the machinery of the inclined planes of the Portage Railroad.

The machinery was designed by him, and it worked well. At the head of each plane were two engines of about thirty-five horse-power each; and each engine had two horizontal cylinders, the pistons of which were connected with cranks at right angles to each other, which gave motion to the large grooved wheels, around which the endless rope passed, and by which the rope was put in motion. The engines were built in Pittsburgh, and could be started and stopped very quickly. One engine only was used at a time, but two were provided for the greater security. Hemp ropes were at first used, and gave much trouble, as they varied greatly in length with the changes in weather, although sliding carriages were prepared to keep them stretched without too much strain; but wire ropes were afterwards substituted, and were a great improvement.

The laying of the first track and turnouts, with a double track on the inclined planes, was contracted for on the 11th of April, 1832. The rails used weighed about forty pounds per lineal yard, and they were rolled in Great Britain. The hauling of them in wagons from Huntingdon, on the Juniata, was laborious work. The rails were supported by cast-iron chairs, weighing about thirteen pounds each; the chairs being placed three feet apart from centre to centre, with a wrought-iron wedge in each chair. In most cases, these chairs rested upon, and were bolted to blocks of sandstone, containing three and a half cubic feet each, and imbedded in broken stone. These stone blocks were required to be two feet long, 21 inches wide, and 12 inches deep. They cost about 53 cents each. On high embankments a timber foundation was used, with cross-ties, and mud sills, which stood much better than the stone blocks. On the inclined planes, which were to be worked by means of ropes, flat bar rails were laid upon string-pieces of timber.

Great care was taken in the drainage of the road-bed, and a large number of culverts and drains were built, there being 159 passages for water under the railroad. It was found by experience, that the track must be tied across with cross-ties, or it could not be kept from spreading, and many such ties were put in between the stone blocks. The attempt to construct a permanent railroad track, containing no perishable material, was in this case a failure. We were striving to build a great public work to endure for generations, and, as it turned out, it was superseded by something better in about twenty years.

On the 26th of November, 1833, about two years and a half from the beginning of the work, the first car passed over the road, carrying a committee from Philadelphia, among them were Josiah White and Thomas P. Hoopes, representing the Board of Trade. They were returning from Ohio, where they had been inspecting the proposed lines for connecting the Pennsylvania and Ohio Canals.

On the 18th of March, 1834, when canal navigation opened, the Portage Railroad was opened for use as a public highway, the state furnishing the motive power on the inclined planes only; and it continued in use until the end of the year, when the canals were closed for the winter. The railroad was again opened on the 20th of March, 1835; shortly after which the second track was completed.

The experiment of working the road as a public highway was very unsatisfactory. Individuals and firms employed their own drivers, with their own horses and cars. The cars were small, had four wheels, and each car would carry about 7000 lbs. of freight. Usually four cars made a train, and that number could be taken up, and as many let down, an inclined plane at one time, and from six to ten such trips could be made in an hour. The drivers were a rough set of fellows, and sometimes very stubborn and unmanageable. It was not practicable to make them work by a time-table, and the officers of the railroad had no power to discharge them. My memory recalls the case of one fellow, who would not go backward, and could not go forward, and so obstructed the road for a considerable time. It resembled the case of the two wild wagoners of the Alleghenies, meeting in a narrow mountain pass, and both refusing to give way. Our nominal remedy was to have the man arrested, and taken before a magistrate, perhaps many miles off, to have him fined according to the law, a copy of which I used to carry in my pocket.

When the road had but a single track between the turnouts, a large post, called the centre post, was set up half way between two turnouts, and the rule was made that when two drivers met on a single track, with their cars, the one that had gone beyond the centre post had the right to go on, and the other that had not reached it must go back to the turnout which he had left. The road was in many places very crooked, and a man could not see far ahead. The way the rule worked was this: When a man left a turnout, he would drive very slowly, fearing he might have to turn back; and, as he approached the centre post, he would drive faster and faster, to try to get beyond it, and thus drive back any cars that he might meet, and in this way cars have been driven together, and a man killed by being crushed between them. We had no electric telegraphs in those days.

The evils of this system were so great, that I resolved that, for one, I would not continue to be responsible for its administration; but to get it changed was no easy matter, as it required an act of the legislature. The State government was Democratic, and this was considered to be the popular way to work a railroad, every man for himself. The opposition party in the legislature was led by a very able man, the late Thaddeus Stevens, of Lancaster County; and they were opposed to increasing the power and patronage of the Democratic Board of Canal Commissioners, which would be done if locomotives were bought, and all the motive power furnished by the State. I went to Harrisburg, and obtained an introduction to Mr. Stevens. I tried my best to explain the matter to him; and it was a great satisfaction to me to find that he allowed the bill to pass without opposing it. The feeling of the people living on and near the two railroads owned by the State, the Portage, and

the Philadelphia & Columbia, was very strong against the measure, for a reason which the following anecdote will show :—

Whilst I was advocating the change, I came to Philadelphia, and then returned to Harrisburg. On my return, I was riding in a horse car on the Columbia Railroad, near Downingtown, which was divided into small compartments, somewhat like the interior of an old-fashioned stage coach. Two gentlemen were sitting opposite to me who were members of the legislature from Chester County, one being a Senator. The car stopped, and a man spoke to my travelling companions, saying that he hoped he would oppose the bill to authorize the Canal Commissioners to put locomotives on the road, and control the motive power. The Senator said that it should never be done with his consent. Thereupon, as the car drove on, I proceeded to argue the matter, but with poor success; the reply being that the people were taxed to make the railroad, and that the farmers along the line should have the right to drive their own horses and cars on the railroad, as they did their wagons on the Lancaster turnpike, to go to market in Philadelphia; and that, if they were not permitted to do it, the railroad would be a nuisance to the people of Lancaster and Chester Counties. It required time to overcome this feeling; and, in 1834, that good man, and excellent mechanic, M. W. Baldwin, of Philadelphia, built three locomotives for use on the Philadelphia & Columbia Railroad.

The law having been passed, locomotives were bought, and the State began to furnish motive power on the grade lines between the planes on the Portage Railroad. The first locomotive used on the mountain was called the "Boston," from its having been built in that city, in 1834. It was a light engine, with one pair of driving wheels, which were made of wood, with iron hubs and tires. The front end of the frame rested on a truck, having very elastic steel springs. The fuel used was wood, and the engine ran readily around the short curves, and, although its power was not great, the machine worked well, and gave satisfaction. It ran on what was called the long level, thirteen miles in length, between planes numbers one and two, and it did not pass over the planes.

The number of locomotives was gradually increased, and that of horses diminished, and on the 11th of May, 1835, the State began to furnish the whole motive power. In that year I had the charge of the working of the Allegheny Portage Railroad, and acted as superintendent of motive power, although called principal assistant engineer.

In October, 1835, Joseph Ritner was elected Governor of Pennsylvania, having been nominated by the Anti-Masonic party; and with his inauguration the control of the state government passed out of the hands of the Democratic party, which had long held it. At that time the feeling against secret societies was very strong, and to be connected with them was very unpopular. It is remarkable that such a change should have taken place in this respect, as secret societies are now so numerous, and their membership so very large; which seems to me to be a curious instance of the strange fluctuations of popular feeling.

The Portage Railroad was a great thoroughfare in 1835; and towards the close of the year Joseph Ritner passed over it on his way to Harrisburg as Governor-elect. He was attended by Joseph Lawrence, of Washington County, who was his confidential adviser. In the same train were Henry Clay and Felix Grundy, on their way to Washington, for the opening of Congress. There was a large party, and we dined together on the summit of the mountain. Joseph Ritner sat at the head of the table, with Henry Clay at his right hand. I remember saying that I had both masonry and anti-masonry entrusted to my care. After dinner, I walked down one of the inclined planes with Joseph Lawrence, and was gratified at being told by him, that the new administration wished me to remain in charge of the railroad; but I had already concluded to resign, and to sail for Liverpool as inspector of the manufacture of railroad iron, in South Wales, for the Reading and other railroads. I had taken no active part in politics, and was weary of the service of the State. The highest pay received by me had been four dollars per day, paying all my own expenses, and carefully abstaining from all speculative interests. It was true that living was cheap; in the best hotel in Johnstown, with a good table, fuel and light, the price of board was only $2.62½ per week. We had venison and wild turkeys in season. Venison was sometimes as low as three cents a pound, and bituminous coal for domestic use cost, I think, about one dollar per ton. Clothing was, however, comparatively dear, and its wear and tear on the mountain was great; besides which it cost a good deal to keep a saddle horse.

My experience in the State service has convinced me, that our form of government is badly adapted to the successful management of public works. Civil service reform might make some improvement, but so long as the tenure of office depends upon frequently recurring popular elections, and the nominations made by majorities in a party caucus, other considerations than those of honesty and fitness will very often determine the result. For the proper management of a railroad, strict discipline is necessary, and the power of discharging employés is needed to insure prompt obedience. In the service of a corporation this is understood, but in that of the State other considerations are apt to interfere.

It is my desire to record my belief, that James Clarke, the President of the Board of Canal Commissioners, was a man of good intentions, and of upright character, who occupied a very difficult position. His home was in Western Pennsylvania, and I knew him well. The Secretary of the Board was Francis R. Shunk, who was afterwards Governor of the State. He was noted for his quaint humor, was an admirable penman, and for a long time Clerk of the House at Harrisburg.

In the official story of the Pennsylvania Railroad, published by the Passenger Department of that Company in 1875, it is stated that, "The Portage Railroad over the Allegheny Mountain was, during all the time it remained in operation, one of the wonders of America."

In 1838 was published in London a book called "A Sketch of the Civil Engineering of North America," by David Stevenson, civil engineer. The author was a son of the distinguished engineer of the Bell Rock Lighthouse. In his sixth chapter, when speaking of the Portage

Railroad, he says that America "now numbers among its many wonderful artificial lines of communication, a mountain railway, which, in boldness of design, and difficulty of execution, I can compare to no modern work I have ever seen, excepting perhaps the passes of the Simplon, and Mont Cenis, in Sardinia; but even these remarkable passes, viewed as engineering works, did not strike me as being more wonderful than the Allegheny Railway in the United States." In another part of the book, he gives an account of his passage over the road.

Michel Chevalier, the distinguished French engineer, and political economist, visited the railroad, and gave a description of it in his book on the public works of the United States, which was published in Paris in 1840. He is now a leader in the project for a railway tunnel under the sea from France to England.

One thing that was considered to be a great curiosity, was the carriage of canal boats over the mountain, which was done to a considerable extent. The road being, as its name implied, a Portage Railroad, a transshipment of some sort was required at both ends of the line, which caused expense and delay. Different firms, engaged in the transportation business, tried different plans to diminish this evil. One plan was the use of boats built in sections, and carried on trucks over the railroad. Another mode of carrying freight was in cars, having movable bodies, which could be lifted off the wheels, and transferred to canal boats fitted to receive them. The wear and tear of the sectional boats, and movable car bodies, and the amount of dead weight that had to be carried were found to be serious objections to both these plans.

For the prevention of accidents, safety cars were used upon the inclined planes. They were devised by Mr. Welsh, the chief engineer, and they worked well. The cars were attached to the endless ropes by small ones called stopper ropes. In case of the failure of any of the fastenings, or the breaking or giving way of a splice in the main rope, the safety car prevented any serious accident, by acting as a brake-shoe or drag, so as to stop the cars, and prevent them from running down the plane.

Thus the communication was kept up between Philadelphia and Pittsburgh, until the time came for something better to be provided. The time required for passenger cars to pass over the road was reduced to about four hours. Many distinguished persons visited the line, the travel was very safe, and the business of 1835 amounted to about fifty thousand tons of freight, and twenty thousand passengers.

The Portage Railroad crossed the Allegheny Mountain at Blair's Gap, a point nearly due east from Pittsburgh; and the excavation or cut made to reduce the summit was only about twelve feet deep, the natural summit being somewhat flat and wet. This summit, as ascertained by recent railroad surveys, was 2322 feet above mean tide, or 161 feet higher than Gallitzin Station on the Pennsylvania Railroad, which is at the western end of the summit tunnel, at Sugar Run Gap, about two miles from Blair's Gap.

There were eleven levels, so called, or rather grade lines, and ten inclined planes on the Portage; the whole length of the road being 36.69

miles. The planes were numbered eastwardly from Johnstown; and the ascent from that place to the summit was 1171.58 feet in 26.59 miles, and the descent from the summit to Hollidaysburg was 1398.71 feet in 10.10 miles.

The planes were all straight, and their lengths and elevations are given in the note at the conclusion of the paper.

The descent on each plane was regular from the top to a point 200 feet from the bottom; the last 200 feet having a gradually diminishing inclination, equal to that of 100 feet of the upper portion. Part of the track, generally 800 feet long, adjoining the head and foot of each plane, was made exactly level. The object of this was to facilitate the handling of the cars.

The cost of the road at the close of the year 1835 was $1,634,357.69, at the contract prices. This did not include office expenses engineering, or extra allowances made to contractors, in a few instances, by legislature, after the work was completed; nor did it include the cost of the locomotives and cars. The cost of the rails for the second track, imported from Great Britain, was $48.51 per ton, when landed in Philadelphia. Acting for the State, I audited the accounts of the importers at the time. Many of the final estimates of the work were made out by me, but I will not encumber this paper with their details.

I may here mention the fact that in 1851, the State began the construction of a road to avoid the inclined planes, with a maximum grade of 75 feet per mile, and a summit tunnel about 2000 feet long. Parts of the old line were used, and the road was lengthened about six miles. A single track was laid down, and was in use in 1856; but in the following year the whole work, as a part of the main line, was sold by the State to the Pennsylvania Railroad Company.

Antes Snyder, the youngest son of Governor Simon Snyder of Pennsylvania, had been inspector of railroad iron in Wales for the State. He was an engineer of good abilities, and of excellent character, and a graduate of the West Point Military Academy. After his return from Wales, he was employed in the State service in Western Pennsylvania. He was offered an engagement to go abroad again, to inspect rails for the Reading Railroad, and other lines, but was unwilling to accept it, so I took his place. He was afterwards in the service of the Philadelphia and Reading Railroad Company on the Lebanon Valley line. He has been dead for some years, and it gives me pleasure to record my high respect for his memory, and for the Christian graces that adorned his character. As the State works were not directly profitable, it has been too much the fashion to assume that the management was utterly corrupt and bad. That such was the case in many instances cannot be denied, but there are many bright exceptions.

Having retired from my position on the Portage Railroad in January, 1836, I sailed soon after from New York to Liverpool. To show the great changes which have occurred in traveling since then, I may mention, that on the 14th of February, 1836, I left Philadelphia at 5 P. M., and was fourteen hours going to New York, with the great Southern mail, although the sleighing was good. We rode in an open sled, or box

on runners, and the four passengers sat on the sail bags. The fare from Philadelphia to New York was six dollars. It is now two dollars and a half, and the time is reduced to less than two hours and a half, being less than one-fifth of the time, and less than one-half of the price. My recollection is that we rode fourteen miles in a railroad car, from Elizabethtown to Jersey City.

Having remained abroad until October, 1837, I examined many public works, and superintended the manufacture of a large amount of railroad iron, and railroad equipments. At the time of my going abroad, anthracite coal was nowhere used for the smelting of iron ore; but in May, 1837, I saw the problem successfully solved by means of the hot blast, by the late George Crane, of the Yniscedwin Iron Works, near Swansea, in South Wales. About the same time, at Bristol, England, I walked over the keel of the steamship Great Western, which had been laid not long before. Her success as a transatlantic steamer was then a question keenly contested, but it turned out to be complete. The length of my return voyage from Liverpool to Philadelphia, in a packet ship, was forty-one days.

The competition which existed between Philadelphia, New York and Baltimore for the trade of the West, led to the passage of an Act to incorporate the Pennsylvania Railroad Company, on the 13th of April, 1846, but the conditions contained in the Act were so stringent, that the Charter was not issued by the Governor until the 25th of February, 1847. A joint special committee of the City Councils of Philadelphia made a report in July, 1846, recommending a subscription to the stock on the part of the city. The committee submitted letters on the subject from a number of engineers, which were printed with the report. In one of these letters written by me, I urged the adoption of the Juniata route, and the use of the Portage Railroad, temporarily, as a part of the line. The Charter, however, did not authorize the use of the Portage Railroad, as the legislature was afraid of the competition of the Pennsylvania Railroad with the main line of the public works. There was also a tonnage tax imposed, to protect the business of the main line, during the season of canal navigation, which was at the rate of five mills, or half a cent, per ton per mile, between the 10th of March and the 1st of December in every year, but the railroad was to be free from the tonnage tax in what was considered to be the winter season. Although this tax was modified, it was not abolished until after the purchase of the main line by the Pennsylvania Railroad Company.

On the organization of the Pennsylvania Railroad Company in 1847, Samuel V. Merrick was chosen President; John Edgar Thomson, chief engineer; William B. Foster, Jr., associate engineer of the eastern division; and Edward Miller, associate engineer of the western division. These gentlemen, so eminently fitted for their positions, as I know from personal knowledge, they having been my intimate friends, are all dead.

In my opinion, the location of the Pennsylvania Railroad deserves great praise; and, as now constructed, it is an admirable road. It has become the main artery of the trade and travel of the Commonwealth, and the population of Philadelphia is about three times as great as when it was begun.

On the 17th of September, 1850, the Pennsylvania Railroad was opened from Harrisburg to a point of connection with the Portage Railroad, at Duncansville, near Hollidaysburg, portions of the line having been opened previously. About that time, Thomas A. Scott, who is now the distinguished President of the Pennsylvania Railroad Company, entered the service of the company as station agent at Duncansville; where he had charge of the transfer of the cars between the road of the company and that of the State. He was soon after transferred to the western division as its superintendent, where he distinguished himself by his remarkable energy, and great executive ability.

On the 15th of February, 1854, the mountain division of the Pennsylvania Railroad was opened for use, with a summit tunnel, and no inclined planes, and the company ceased to make use of the Portage Railroad. There had been much difficulty in obtaining the legislation to authorize the use of the Portage Railroad by the company. The original act of incorporation, passed in 1846, was very defective, and the efforts made to amend it, in the following year, were not successful. The necessary legislation was not obtained until 1848. In that year I was a member of the House of Representatives of Pennsylvania, having been elected from the city of Philadelphia, as one of the five members chosen to represent the old city proper, on a general ticket. The railroad bills in which the city was interested were placed in my hands. A supplement to the charter of the Pennsylvania Railroad Company was obtained, which conferred many valuable privileges. It provided a more just and equitable mode of assessing land damages; it confirmed the city subscription to the stock; it authorized the county of Allegheny to subscribe for stock to the amount of a million dollars, which was afterwards done; and it authorized the connection with the Portage Railroad. It also made some reduction in the tonnage tax. Legislation was obtained in another bill for the survey of a line to avoid the inclined plane near Philadelphia.

At the same time a charter was obtained for a railroad from Pittsburgh westward, on the line towards Fort Wayne and Chicago. I was afterwards the chief engineer of it, from Pittsburgh to Crestline, a distance of 186 miles. I had charge of the location, construction, and working of the road as far west as Crestline from 1848 to 1856, and the towns of Alliance and Crestline were located, and their names selected by me. This line was originally called the Ohio and Pennsylvania Railroad, as it was chartered by both of those States, and was the first line to connect their railroad systems. It has become a most important feeder to the Pennsylvania Railroad. On the 6th of January, 1852, the road was opened from Pittsburgh to Alliance, 82 miles, where it connected with a railroad to Cleveland; and, very shortly after, I took Louis Kossuth and his party of Hungarians over it, which was the occasion of a great ovation. The road was opened to Crestline on the 11th of April, 1853, where it connected with a direct railroad to Columbus and Cincinnati. This road thus opened has now been in use about twenty-five years, and has been of great public utility.

The completion of the line between Crestline and Chicago was delayed by financial difficulties for some years; but it was opened throughout in December, 1858, mainly by the efforts of John Edgar Thomson.

The competition which was for some time carried on between the Pennsylvania Railroad and the main line, owned by the State, was found to be injurious to both; and, after protracted negotiations, the State sold its line to the company. On the 20th of July, 1857, a meeting of the stockholders of the Pennsylvania Railroad Company was held at Sansom Street Hall, to act upon the purchase of the main line, of canals, and railroads between Philadelphia and Pittsburgh. Having been selected for the purpose, I offered the resolutions, and spoke in their favor. The measure was adopted with but little opposition, and on the first of the following month, August 1st, 1857, the Governor, by proclamation, transferred the main line to the railroad company. The Pennsylvania Railroad Company thus became the owner of the Portage Railroad, and, as it was not to the interest of the company to keep it up and work it, it soon went out of use. It had had its day, and something better had taken its place; and, instead of lasting for many generations, the time of its existence was but about twenty-five years.

The great improvements made in locomotive engines have enabled them to work to advantage on steep grades, so as to supersede stationary power, and to draw long and heavy trains continuously for many miles, without stopping for any change. Railroad tracks have also been greatly improved. The foundations are better; the rails are longer and stronger; the joints are fewer and much safer; the switches and signals are much safer than they were. Steel rails, and steel tires on locomotive driving-wheels, have come into extensive use, and add much to the durability and safety of the roads. Switch rails were at first of cast iron; and afterwards of rolled iron, with a pivot, or hinge, welded on at the heel of the switch. On the Portage Railroad I introduced the plan of holding the switch rail fast in a chair, and bending the rail by the switch lever, as is now done in the common stub switch. Improved safety switches have since been invented, and are now extensively used.

When I went to the Iron works in Wales in 1836, the rails were allowed to get cold, after coming from the rolls, and the ends were afterwards reheated, and the fag ends cut off by hand. While I was there, the circular saws were brought into use, by which the ends of the rails are now cut off when hot from the rolls. The iron rails made under my direction, at the Ebbw Vale Iron Works, for the Reading Railroad, were unusually good for that time; but good steel rails of American manufacture can now be bought for less than those cost in Wales.

Fifty years have passed since I rode on the Mauch Chunk Railroad, on the first train of cars that ever ran in Pennsylvania, and during that long period my interest in the growth of our railroad system has never ceased. Four years later, when I led the locating party on the Allegheny Portage Railroad, it was with a feeling of enthusiasm for my professional employment, which it gives me pleasure to recall. To be useful to my native State and city, and to help to promote the prosperity of Pennsyl-

vania, were my lively hope and strong desire, for it is a State of which we may well be proud. The strong foundations of her history were laid by William Penn, in principles of truth and justice which must endure forever. Although the railroad of which I have spoken has ceased to exist, yet I need not say,

> "So fades, so perishes, grows dim, and dies,
> All that this world is proud of."

Or, "What profit hath a man of all his labor, which he taketh under the sun?"

The present is the child of the past, and will be the parent of the future, and to keep the past from being forgotten, and to preserve its lessons for our instruction, is the highly useful office of the Historical Society of Pennsylvania, which I trust will continue to fill, for the benefit of those who may come after us, for many generations.

NOTE

The following table gives the Profile of the Portage Railroad. The grade lines between the inclined planes, and between the planes and the terminal stations, which were worked by horse power, or by locomotives, were called "levels." There were some minor variations in the grades on the levels, made to suit the ground, which are omitted from the Table; but from the lengths and heights here given, the average grade of each "level" may be obtained correctly.

	Length	*Rise*
Level No. 1. From Johnstown to Plane No. 1	4.13 miles	101.46 ft.
Plane No. 1, Ascending eastward	1607.74 ft.	150.00 ft.
Level No. 2. Ascending eastward Long Level	13.06 miles	189.56 ft.
Plane No. 2. Ascending eastward	1760.43 ft.	132.40 ft.
Level No. 3. Ascending eastward	1.49 miles	14.50 ft.
Plane No. 3. Ascending eastward	1480.25 ft.	130.50 ft.
Level No. 4. Ascending eastward	1.90 miles	18.80 ft.
Plane No. 4. Ascending eastward	2195.94 ft.	187.86 ft.
Level No. 5. Ascending eastward	2.56 miles	25.80 ft.
Plane No. 5. Ascending eastward	2628.60 ft.	201.64 ft.
Level No. 6. Ascending—Summit Level at Blair's Gap	1.62 miles	19.04 ft.
Total Rise		1171.58 ft.

	Length	*Fall*
Plane No. 6. Descending eastward	2713.85 ft.	266.50 ft.
Level No. 7. Descending eastward	.15 miles	0.00 ft.
Plane No. 7. Descending eastward	2655.01 ft.	260.50 ft.
Level No. 8. Descending eastward	.66 miles	5.80 ft.
Plane No. 8. Descending eastward	3116.92 ft.	307.60 ft.
Level No. 9. Descending eastward	1.25 miles	12.00 ft.
Plane No. 9. Descending eastward	2720.80 ft.	189.50 ft.
Level No. 10. Descending eastward	1.76 miles	29.58 ft.
Plane No. 10. Descending eastward	2295.61 ft.	180.52 ft.
Level No. 11. Descending to Hollidaysburg	3.72 miles	146.71 ft.
Total fall		1398.71 ft.

EDITOR'S NOTE: One cannot but appreciate this interesting description of the old Portage R. R. with its personalities and its operation, its triumph and final disuse. Mr. Roberts mentions the engine "Boston" as the first one on the road. This engine was one of two known engines built by R. M. Bouton—Milldam Foundry, Boston, Massachusetts. Just how this Yankee-built engine ever happened to be sold to this road in the Allegheny Mountains is a mystery that would be difficult to solve.

Additional references to the engines of this road will be found in the U. S. Report of 1838 and in the Annual Reports of the Company. There are some variations between the two authorities and they will be noted here.

Bush Hill	Wm. Norris	1837
George Washington	Wm. Norris	1836
Independence	Wm. Norris	1837
Benjamin Franklin	Wm. Norris	1836
Robert Morris	Wm. Norris	1836
James Madison	Wm. Norris	1837
La Fayette	Wm. Norris	1837
United States	Wm. Norris	1837
Constitution	Wm. Norris	1837
Mountaineer	McClurg Wade & Co.	1837
Pennsylvania	McClurg Wade & Co.	?
Pittsburgh	McClurg Wade & Co.	1835
Back Woodsman	McClurg Wade & Co.	1836
Allegheny	E. A. G. Young	1835
Tennessee	E. A. G. Young	1833
Comet	E. A. G. Young	1836
Boston	R. M. Bouton	1835
James Clark	D. H. Dotterer & Co.	1840
David R. Porter	D. H. Dotterer & Co.	1840

The above engines are given on the roster for 1841 issued by the road. Four years later, three more engines were delivered:

Kentucky	M. W. Baldwin	1835
Ohio	M. W. Baldwin	1835
Paoli	M. W. Baldwin	1837

These three engines were on the other state owned road—the Philadelphia & Columbia R. R. and were transferred from them.

The U. S. Report of 1838, in addition to the above lists:

Delaware	E. A. G. Young	1833
Conemaugh	McClurg Wade & Co.	1836

and the "Tennessee" and "Pennsylvania" are not listed on the U. S. Report of 1838. Possibly they may have been renamed.

C. F. Dendy Marshall in his "Two Essays in Early Locomotive History" also credits the following engines to the Portage R. R.

Delaware	Braithwaite, Milner & Co.	1833
Allegheny	Braithwaite, Milner & Co.	1834
Pennsylvania	Robert Stephenson	1834
Philadelphia	Robert Stephenson	1834
Comet	Braithwaite, Milner & Co.	1837

The latter may have been purchased from the Philadelphia & Reading R. R.

The early motive power of this road is difficult to trace on account of the two State owned roads and some of the locomotives on the Allegheny Portage R. R., first saw service on the Philadelphia & Columbia. Our two best authorities are the U. S. Report of 1838 and the 1841 roster found in the Annual Report of the railroad. The late J. Snowden Bell in Record No. 97 of the Baldwin Locomotive Works gives valuable help in this matter, but it is to be regretted that Mr. Roberts, who was present when the change from horses to locomotives was made, could not have left us some details of the earliest engines on this road.

The Borden Collection

This spring, your Society purchased from the heirs of the late Phillip D. Borden of Fall River, Massachusetts, his entire collection of photograph albums, books, plates, etc. Work of sorting and cataloguing this collection has proceeded slowly.

This summer, due to the erection of a chimney in the East Wing of the Baker Library, little work of any kind could be done there. Our exhibition that usually attracts so many summer visitors was only for those who dared brave the dust and tools of the workmen and even then, not all of our material was on display.

As rapidly as time permits this collection will be put into shape. There are a large number of duplicate prints that will be sold to our members at a nominal price in lots of a dozen or more. There are a large number of negatives, prints from which will be sold at the standard price and many of these are of decided interest and value. Our members will be notified at the time when this material is for distribution or prints from the negatives are for sale. You will confer a favor if you do not address inquiries to our Curator for detailed information as it will be impossible to furnish anyone with detailed information for some time to come.

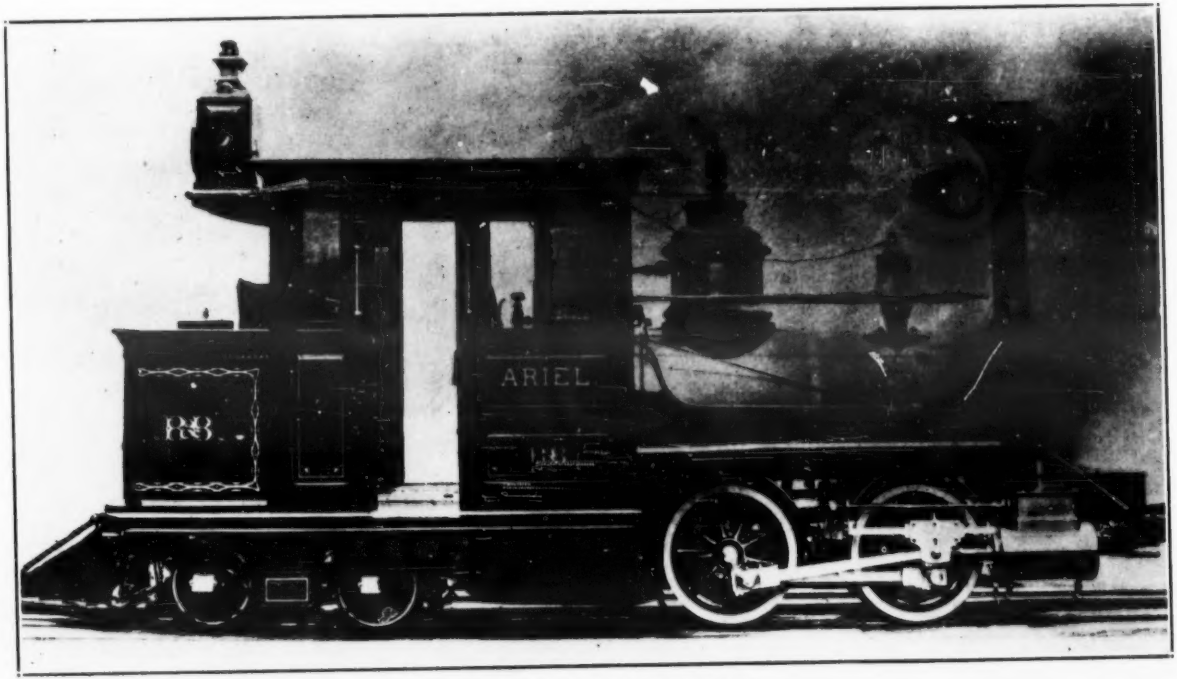
The Billerica & Bedford Railroad of Massachusetts

By Laurence Breed Walker

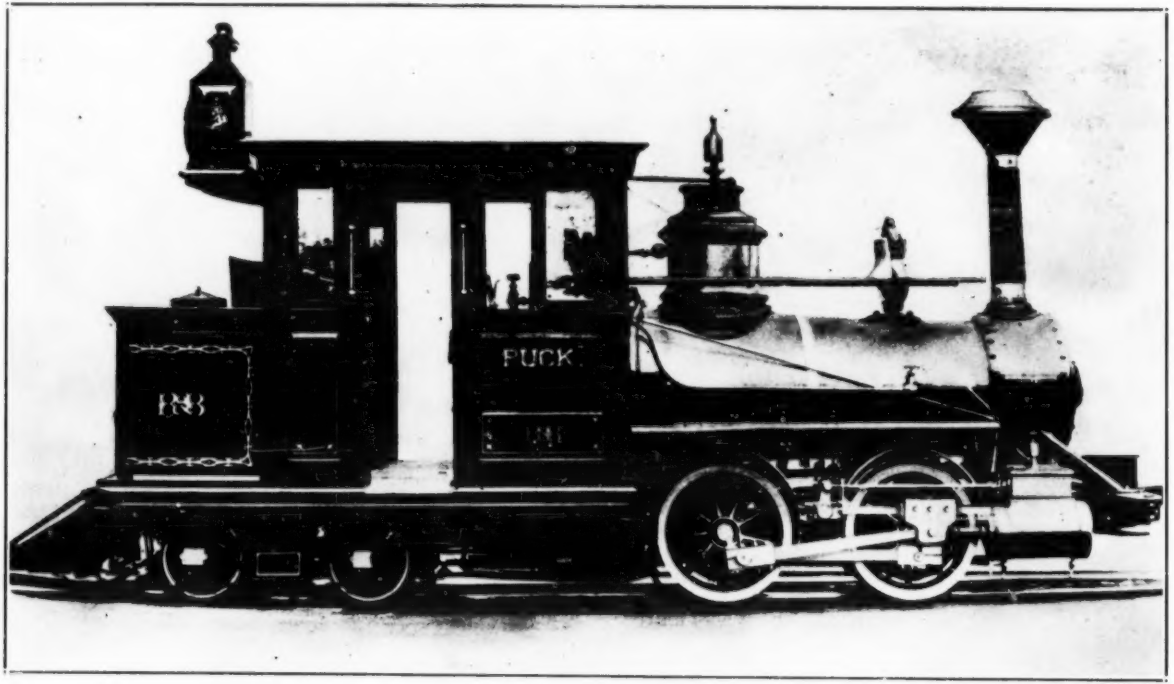
ACROSS from the station at Phillips, Maine—during the summer of 1936, stood an old "camp car," awaiting the cruel hand of the wreckers. The last traces of the Sandy River & Rangeley Lakes Railroad were being obliterated—a railroad that only a few years previous, had been the largest and most extensive two foot gauge system ever constructed. Armies of photographers had thronged through this little Maine town both before and after the termination of railway service, determined to take pictures of interesting as well as historic sights. Strangely enough, few if any lingered long enough to inquire or even glance at old Camp Car No. 476—which was unquestionably the most interesting piece of rolling stock on any American Railway line. Virtually unchanged from the time it was built at Laconia, New Hampshire in 1878 for the BILLERICA & BEDFORD RAILROAD, it was the first coach ever to be completed for a two foot gauge line in America or in any other land.

The general lack of interest that was shown for this combination car at the Phillips Station was due to the fact that few are aware that the pioneer of all two foot gauge lines was in Massachusetts—operating between the towns of Billerica and Bedford. It was in 1872 that Mr. George Mansfield of Boston returned from a European Trip. In travelling through Wales he had occasion to ride on a novel 14 mile 60 c.c. gauge railroad. In the American Standard of measure that would be in the neighborhood of 23⅝ inches. Representative of the New England pioneering type of manhood, Mr. Mansfield was immediately arrested by unlimited possibility of adapting such a type of railroad to American needs. He was immediately aware also of the low initial cost as well as the lessened expenses for maintenance. He saw as well, the potential possibility of building a system of coordinated 2 foot gauge lines in his native New England.

Promptly upon his return to Boston, he arranged a conference with the experts of the Hinkley Locomotive Works. They were aware of the difficulties of creating a system of 60 c.c. gauge lines and realized that the establishment of a 24 inch gauge would considerably simplify their task and would not in any way threaten the practicability of the contemplated small gauge line. There are however many railroads in Europe that were built to a 60 c.c. gauge and even in Mexico and South America as well. The Honoros and one of the branches of the Mexicano are built to the French Standard of 60 c.c. So induced to accept the 24 inch gauge idea, Mr. Mansfield started out with unbounded enthusiasm for his new venture. Very naturally he made a study of railroad lines that were already contemplated but upon which construction had not commenced. The citizens of Billerica and Bedford in Massachusetts had been discussing the possibility of the construction



Billerica & Bedford "Ariel." Hinkley, 1877.



Billerica & Bedford "Puck," Hinkley, 1877. Courtesy of H. T. Crittenden.

of a railroad line which would connect the two towns and would in turn connect with trains already operating into Boston. By utilizing what high pressure sales methods were at his disposal, he arranged for a mass meeting of the dwellers in the two towns as well as the farmers living along the projected route and very dramatically presented his plan for a miniature railroad that would meet all of their demands and yet not be prohibitive in initial financial outlay.

ON MAY THE FIRST, 1875, a charter was granted to Mr. Mansfield to start the building of the Billerica & Bedford Railroad. The new company was immediately formed. Mr. Charles Bartlett was elected its first President. Surveys and subscriptions for the new Railroad required some time and it was not until September the ninth that ground for the construction was finally broken. Greatest of enthusiasm attended the opening move of this new venture. Throughout the country-side a holiday was declared. Careful surveys had been made and the very greatest of care was exercised in the construction because of the novelty of the enterprise involved and because it was earnestly hoped that this little line would be a fore-runner of many similar small gauge lines in New England.

THE BILLERICA & BEDFORD RAILROAD was finally opened on October 16th, 1877. Two novel 11 ton Forney engines—the "Ariel" and the "PUCK" were built by the Hinkley Locomotive Works of Boston. The weight of each engine in working order was 23,750 lbs. The total wheel base was 13 feet. The driving wheel base was 3 feet and 6 inches. The cylinders were 8 inches in diameter and with a 12 inch stroke. The driving wheels were 30 inches in diameter and the grate was 30 inches long and 27 inches wide. The two engines were built to run tank first so that although they were constructed as regulation 0-4-4T—they were in reality a 4-4-0T type. They were both constructed as coal burners and had a slight diamond stack.

Two cars for passenger service were built at Laconia, New Hampshire. "THE FAUN"—to which reference has already been made—was a combination passenger and baggage car of regulation design and built to accommodate 20 passengers. Each seat was designed for only one individual. The length of the car was 40 feet and the weight including trucks was 9000 lbs. It was equipped with Miller platforms and 18 inch wheels. This was the first 24 inch gauge car ever designed, ordered or constructed and the only piece of the original equipment that was retained in service until 1936.

A regulation passenger coach was also built. Like the "Faun" it too was given a romantic name—"THE SYLVAN." This likewise weighed 9000 lbs and was 40 feet long. Two open observation cars for summer as well as excursion service were also built at Laconia—and lettered "B" and "C". They resembled the regulation type of open car common on the Electric lines of New England in the early days of the 20th century. There was also delivered to the new company a large box car with platforms for both freight and baggage service which was lettered "A". Seven flat cars for coal or freight, completed the initial equipment order of the B. & B. R. R. All rolling stock was equipped with Vacuum brakes.

The novelty of the narrow track and light equipment as well as the cheap construction costs attracted widespread attention. Engineers as well as private citizens journeyed from long distance to see the little trains in operation. They were generally interested in the feasibility of similar construction in other parts of the country. The *Scientific American* of March 16, 1878 published a lengthy article on the railroad with details of the construction as well as builders photographs of engines and rolling stock.

For only a few months, however, did the villages enjoy railroad facilities. As far as the feasibility of its successful operation from a mechanical standpoint was concerned—the railroad was in every way a complete success. The estimated cost had been $8000 a mile, or a grand total of $50,000. But when the bills were finally all in the treasurer's hands it was discovered that $60,000 had been expended. A large portion of the subscriptions proved to be fraudulent and the little line began operations under anything but auspicious circumstances. During the first few months only the bare expenses were earned. The directors found themselves unable to make the contemplated additions or to purchase the extra equipment that was vitally necessary to a successful operation of the railroad. They could not even secure the necessary cash to continue operations and to pay the stock holders and for some reason they failed to win over a sceptical public. Thus they were unable to test the question in which the promoters had the utmost faith—namely—that a 2 foot line with the necessary branches and connections could be far more profitable than the standard gauge with its heavy rail and expensive rolling stock. One very naturally wonders what the effect might have been on the development of steam railroad transportation in America if the promoters of this Massachusetts venture could have realized their fondest dreams. It is almost a certainty that a net work of coordinated 2 foot gauge lines would have met the transportation needs of the New England states.

The two towns that had originally subscribed to the construction of the B. & B. R. R. steadfastly refused to give additional money. Mr. George Mansfield, the promoter of the original enterprise had been to Strong, Maine and aroused the farmers of Franklin County to finance the construction of a 2 foot gauge line from Farmington to Phillips through the town of Strong. Under the leadership of Mr. Mansfield a charter was granted to the Sandy River R. R. in 1879. No sooner had operations ceased on the B. & B. R. R. than the directors of this newly formed Maine Company purchased the engines and the rolling stock of the B. & B. as well as the 25 lb. rail. The engine "Ariel" was rebuilt at Farmington by the new owners. Mechanics from the Hinkley Loco. Works were brought from Boston and engineers made alterations in the original designs. Coal was scarce in the northern section of Maine and the engine was rebuilt as a wood burner. It was also reconstructed to operate as a 0-4-4T type rather than tank first. It carried the name SANDY RIVER R. R. and was numbered No. 1. The "Puck" was also rebuilt from the same engineering plans and was numbered No. 2. Later this engine was sold to the Phillips & Rangeley Railroad and

was numbered No. 4 and named "Bo-peep." The number 1 was involved in an accident with a snowplow and was rebuilt with a huge balloon stack. Later both engines were again rebuilt as coal burners and equipped with straight stacks.

The history of the town of BILLERICA reports that in 1883 "time is rapidly obliterating the road bed through the two towns and the children of coming generations will listen with some doubt to the stories that in the days of their fathers—service between Billerica and Bedford was rendered by a tiny 2 foot gauge line that at the time of its construction was the ONLY railroad of its size in the world." Even, however, in 1937 it is possible to trace the old road-bed of the little line through some of the country districts. The B. & B. was the fore-runner of such roads as the Bridgton & Saco River R. R., the Monson R. R., the Wiscasset & Quebec R. R., the Wiscasset, Waterville & Farmington R. R., the Eustis R. R., the Franklin & Megantic R. R. and other similar 2 foot gauge systems.

It was reported that at the time the equipment was sold, emotions in both Billerica and Bedford were of amusement mingled with keen regret and chagrin. Close by the abandoned right of way of the B. & B. R. R. is now located the great locomotive repair shop of the Boston & Maine R. R. The traces of the abandoned roadbed after 50 years are mute evidence of broken dreams but of a noble experiment brought to naught by the reluctance of the residents of two towns to take part in a pioneering project that might have had far reaching effects. One instinctively stops on dark and stormy nights, if in the vicinity of the Railroad Bedford terminus of the old Billerica & Bedford Railroad, and wondering if like some phantom spirit of a long dead past we might see through the mist the shadowy figure of the little "Puck" with its lamp lighted coach backing into the station or hear again the scream of the shrill whistle of the little "Ariel" as it rounded the bend into the station-yard—awakening echoes that time has failed to efface.

Memberships

Effective September 15th, 1937, Mr. Harold S. Walker, our Assistant Secretary, has been placed in charge of all matters relating to membership in this Society. The maintaining of our records, issuance of membership cards, etc. will be handled by Mr. Walker. Your attention is respectfully called to this change, brought about by the necessity of relieving our Treasurer from these duties. Bills for your 1938 membership will be in the mails some time next December and your dues should be forwarded directly to Mr. Harold S. Walker, not to the Treasurer as in the past. To send them elsewhere will cause a delay in the receipt of your membership card and, in order to have your name in our printed membership roster, your dues must be paid.

The Newfoundland Railway

By Robert R. Brown

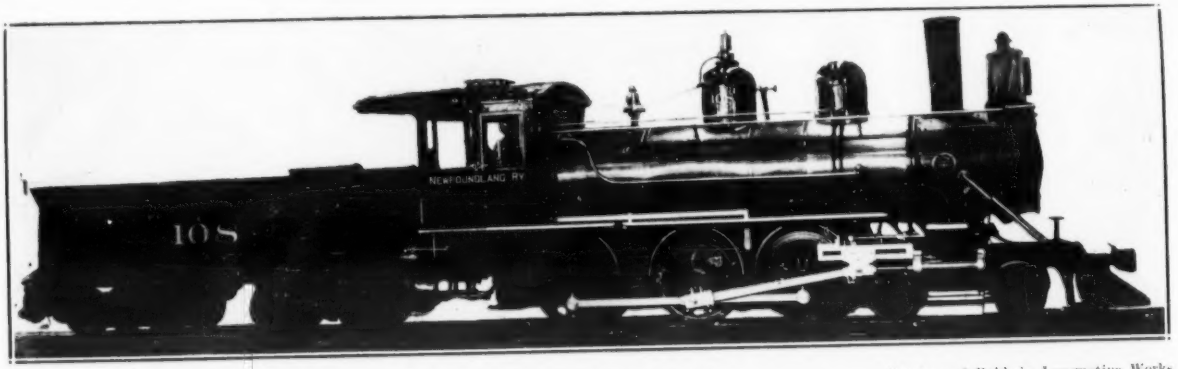
TO MOST Americans, and to a good many Canadians too, Newfoundland is thought to be an appanage of Canada; rather close to the North Pole, where fogs, ice-bergs and the aroma of drying codfish are predominant characteristics. Actually there is no political connection between Newfoundland and Canada, they are separate Dominions independent of each other; the climate is temperate and, if one may judge by the robust appearance of the people, it must be healthy; but the fishy smell cannot be denied. Newfoundland is the oldest overseas unit of the British Empire and, as it was settled at an early date and, for many years, was isolated from the rest of the world, many quaint and obsolete forms of English speech persist and in some of the remote sections it is very difficult to understand the people or to be understood. As might be expected, there are many peculiar place names and in the time table may be found; Fox Trap Y, Tickle Harbour, Come-by-Chance, Fogo, Joe Batt's Arm, Heart's Desire and Seldom-come-by, to name a few.

The Newfoundland Railway, in one respect, is unique among the narrow gauge railways of North America because instead of being on its last legs, its future seems brighter than its past. It is also the largest, having 747 miles of line in regular operation, and it certainly has the most modern equipment. True there is still plenty of red ink in the financial reports but the large deficits have been due mostly to long-deferred repairs and renewals and, with a return of prosperity to the island, there is no reason why the railway, with its present efficient management, should not earn reasonable profits. The latest financial statements available are:

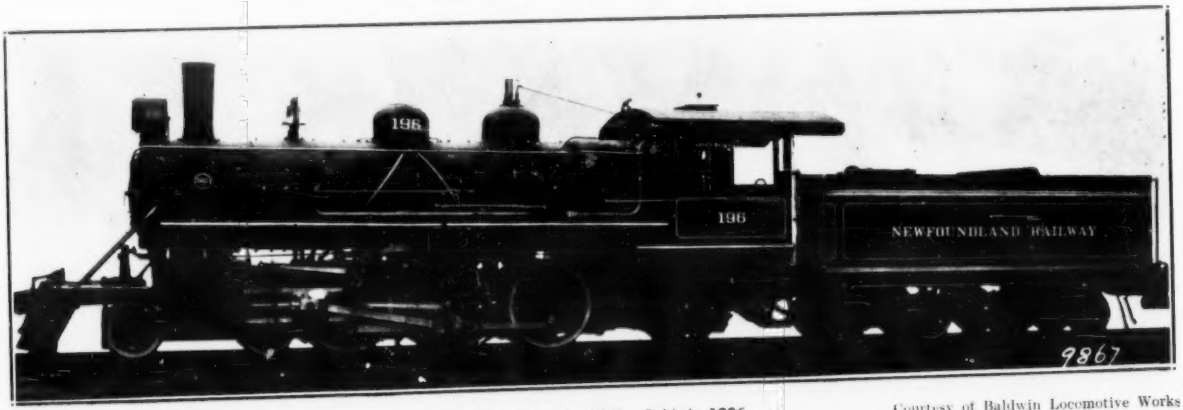
	1933	*1934*
Earnings	$2,208,565.	$2,573,896.
Expenses	2,422,897.	2,711,514.
Deficit	214,332.	137,514.
Passengers	112,819	127,392
Tons of freight	340,245	386,112

A glance at a map of Newfoundland gives one the impression that the builders of the railway believed in the old Arab proverb that the only decent and proper way across one side of a square is to go around by the other three sides but actually the road was not planned originally as a cross country line but, like Topsy, it "just growed." The island is roughly triangular in shape and the main line of the railway starts from St. John's, in the south-east corner, and runs in a north-westerly direction for about 230 miles, then directly west for about 130 miles and finally in a south-westerly direction, down the west coast, 183 miles to Port aux Basques, the point nearest to Canada, where connection is made with the steamship "Caribou," running to North Sydney, Nova Scotia.

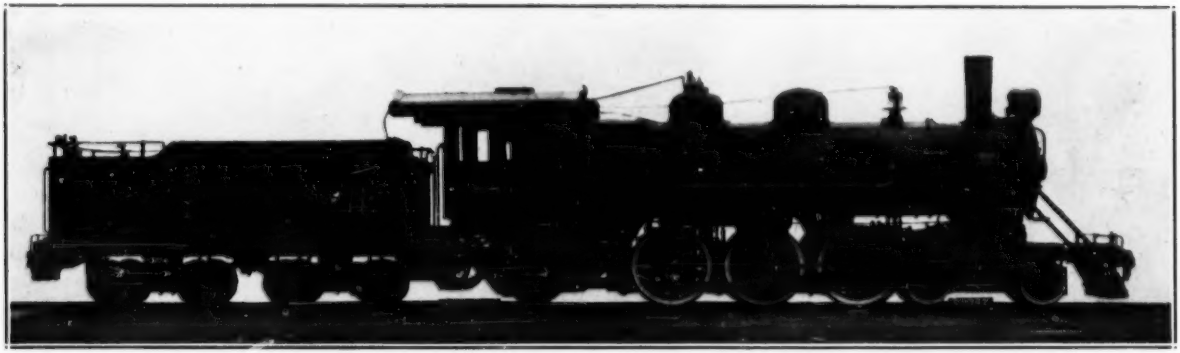
From St. John's to Topsail, a distance of 13 miles, the line runs



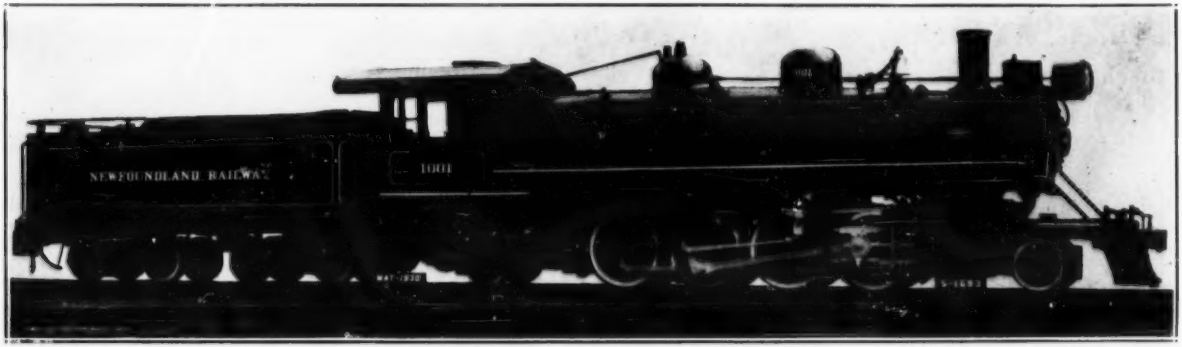
Newfoundland Ry. #108. Baldwin 1899. Courtesy of Baldwin Locomotive Works



Newfoundland Ry. #196. Baldwin 1926. Courtesy of Baldwin Locomotive Works



Newfoundland Ry. #197. Montreal 1926. Courtesy of American Locomotive Co.



Newfoundland Ry. #1001. Schenectady. 1930. Courtesy of American Locomotive Co.

through a mountainous and densely wooded country with a few stony farms here and there, then for 17 miles from Topsail to Holyrood, it runs along the shore of Conception Bay; in some places along the beach itself and when the gales blow in from the north-east the trains are well drenched with salt spray. Along the bay shore there are numerous farms but the large number of boats, drawn up on the shore, are an indication that the people are still fishermen at heart. Beyond Holyrood and continuing for about 50 miles, the line crosses the Harbour Grace Barrens, a wild desolate region of grotesquely-shaped rocky mountains, where the only vegetation is moss, blueberry bushes and a few stunted spruce trees which, even in the most sheltered spots, rarely exceed four or five feet in heighth. The barrens were at one time heavily wooded but the early settlers regarded the forest as a nuisance and a menace and a deliberately-set forest fire destroyed about 3,000 square miles of excellent timber land. In rainy weather, which is almost all the time, the barrens are very dreary but on a sunny day in the autumn, when the leaves of the bushes have turned to red, brown and yellow amongst the reddish-brown rocks and hills, there is a certain strange beauty that is perhaps comparable to the desert regions of the south-western states. At Come-by-Chance, the Avalon Peninsula is joined to the mainland of Newfoundland by an isthmus which, at this point, is only 4 miles wide and, because of the proximity of foggy Placentia Bay, it is almost always rainy and foggy. From Come-by-Chance to Bishop's Falls, a distance of 164 miles, the line runs through a comparatively flat and densely-wooded country, crossing several large rivers, and passing, at Cobb's Camp, 216 miles from St. John's, the new trans-Atlantic airport, of which more will be heard during the next few years. From Bishop's Falls, the headquarters of the Western Division, the line follows the Exploits River for about 30 miles and then west of Millertown Junction, for about 45 miles, the line crosses the Northern Barrens. This northern part of the great central plateau is high but comparatively flat and, except for moss and low bushes, is entirely devoid of vegetation. Numerous conical and sugarloaf hills of bare rock rise abruptly from the level plain and in some cases bear a remarkable resemblance to the sails of ships far out at sea, which is responsible for the name, Gaff Topsails, given to this region. There are large areas of muskeg swamp and numerous lakes, ponds and brooks and so great is the rainfall that it is estimated that one-third of the total area of Newfoundland is under water. Almost continuous snow fences are an indication of the severity of the winter storms in the Gaff Topsail region and even in summer it is occasionally so windy that the trains cannot run. At Hawley the railway touches the shore of Grand Lake, the largest in the island, and a few miles beyond, at Main Dam, the railway runs across the top of the dam which was built at the outlet of the lake to raise its level. On the upper side of the dam the water is only a few feet below the track but on the lower side there is a drop of over 100 feet and usually there is a large volume of water flowing through the spill-ways. A few miles beyond, at Deer Lake, the water from Grand Lake is brought down the hillside, in huge wooden flumes, to the hydro-electric power plant which supplies

power to the paper mill at Corner Brook. From Deer Lake to Curling, 34 miles, the railway follows the Humber River; in some places a broad, placid stream and at others flowing through a narrow gorge with high mountains and steep cliffs on either side. The scenery in the Humber Valley is the finest in the country and cannot be beaten by any other country. South of Humbermouth, especially in the Codroy Valley, is the best farm land and the cutting of pulp wood is an important industry and incidentally a source of revenue for the railway. For about 25 miles before reaching Port aux Basques there is another barren region and a peculiarity of this part is the large number of gaunt, gray skeletons of long-dead trees lying about.

As all early settlements in Newfoundland were on the coast there was little need for inland transportation and it was not until 1847, when the St. John's *Morning Post* advocated the building of a line from that city to Harbour Grace and Carbonear, that the possibility of railway construction was even considered. Many years passed before any definite action was taken but in 1875 the Legislature appropriated the money for a preliminary survey from St. John's directly west, along the south coast, to St. George's Bay, not far from Port aux Basques. The survey was made by a party of Canadian engineers, under the direction of Sanford Fleming who had just completed the construction of the Intercolonial Railway, and, although the route they surveyed was never used, it was clearly shown that a light, narrow gauge railway could be built from St. John's to the west coast at a reasonable cost per mile.

In 1882 a charter was granted to the Great American and European Short Line Railway Company to build a railway on the line surveyed by Fleming, the object being to shorten the route between Europe and America by using fast steamers between Ireland and St. John's, by railway from there to Cape Ray and by ferryboat to Cape Breton, there connecting with the railways of Canada and the United States. The railway in Nova Scotia from Pictou to Oxford Jct., was part of the same scheme. The trans-Atlantic feature was an impossible dream but as a cross country line it would have been about 200 miles shorter than the one actually built.

The Newfoundland Railway Company was incorporated on June 1st, 1881 to build two lines of railway; one from St. John's to Harbour Grace, via Whitbourne, known as the Southern Division; and another line, known as the Northern Division, from Whitbourne to Hall's Bay, on the north coast about 300 miles from St. John's, where mineral deposits raised false hopes of a future mining development. The Capital Stock of the Company was $6,000,000. and, to facilitate an early start, 50-year 6% Southern Division Bonds, guaranteed by the Newfoundland Government to the extent of £400,000, were sold in England, and in August 1881 actual construction was started at St. John's and Harbour Grace. The gauge adopted was 3′ 6″ which, at one time, was very common in Canada and proved to be more satisfactory than the American narrow gauge of 3 feet and the metre gauge used extensively in Africa and Asia. This opinion is based on personal experiences on the Newfoundland cross country line and the metre gauge South Indian Railway from Madras to Dhanushkodi; journeys of approximately equal length.

In a contract with the Company, the Government of Newfoundland agreed to pay a subsidy of £108 per mile per annum for a period of 35 years and further a grant of 5000 acres of land for each mile of railway built; the subsidy to be paid and the land grant to be made upon the completion of each section of five miles.

The Report of 1883 contains the usual "conservative" but optimistic estimates of probable results which however fell far short of expectations:

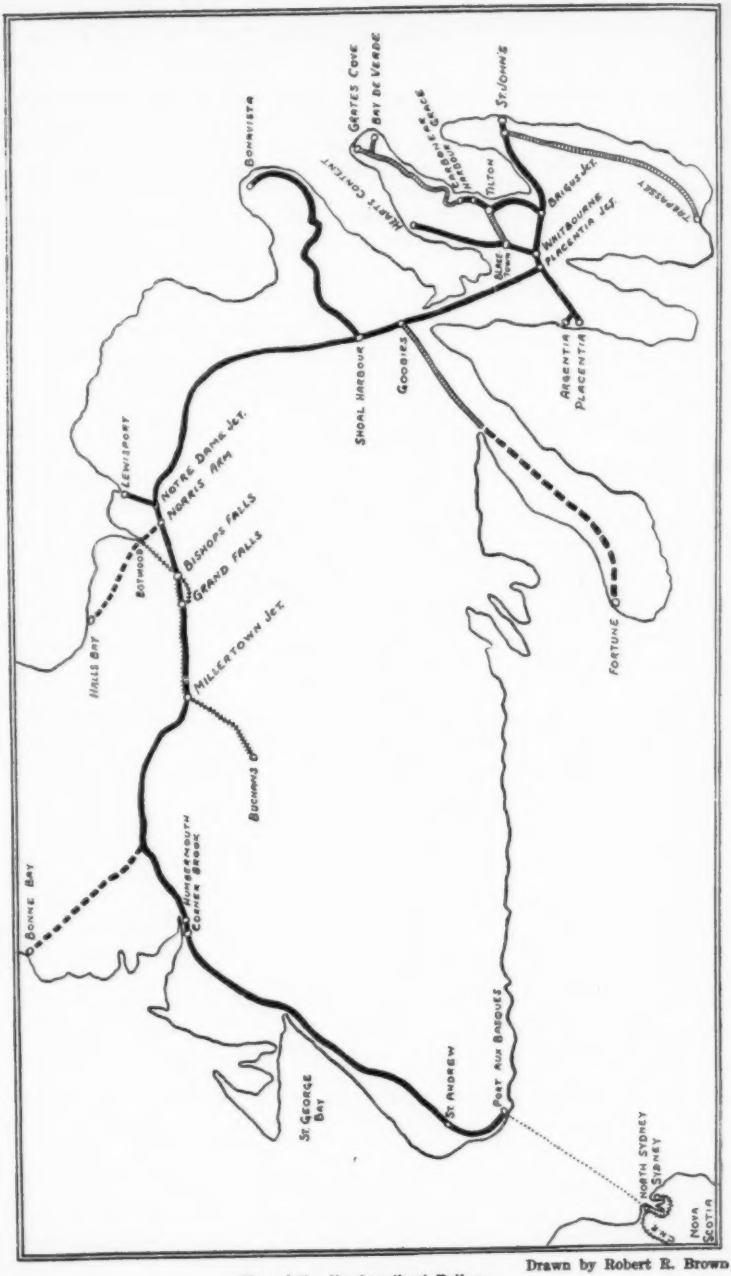
Probable Gross Earnings	£80,000
Operating Expenses 40%	32,000
	48,000
Government subsidy	10,800
	58,800
Bond Interest	24,000
Surplus	34,800

Practically every cent of the money used to build the road had been supplied by the Government, either by the guarantee of the Company's bonds or by the annual cash subsidy; which was really in the nature of a Sinking Fund as the total for the 35 year period was to be £3780 ($18,370.) per mile, which was slightly more than the actual cost. The Company completed the railway from St. John's to Holyrood and from Harbour Grace to Blaketown but then became bankrupt so the line was taken over and completed by the Government. In the early spring of 1884 regular service was inaugurated between St. John's and Holyrood, where connection was made with a government steamer for Brigus, Bay Roberts, Harbour Grace and Carbonear; and finally, in November 1884, the line was completed through from St. John's to Carbonear, a distance of 93 miles.

The cost of the right-of-way and land damages amounted to £30,000 but the valuable land acquired in the city of St. John's was estimated to be of greater value than the total expenditure for land and right-of-way. This consisted of a wharf property with a frontage of 2,500 feet at the head of the harbour and the grounds of old Fort William, about 10 acres, on which was built a station and machine shops. This station, now the site of the Newfoundland Hotel, was very inconveniently located high up the hillside above the harbour and, after about 20 years, it was abandoned and a new station built on reclaimed land adjacent to the original wharf property. This involved the construction of a new line into the city branching off from the old main line at a point near Donovan's station, about 7 miles out from the city.

In 1886 work was started on the Placentia Railway, from Whitbourne to Placentia and Argentia, and it was opened for traffic on October 2nd, 1888. This branch was built by the Government by day labour but it proved to be so costly that it was decided to invite outside contractors to bid on all future railway work.

In 1890 a more ambitious project got under way when Mr. (afterwards Sir) Robert G. Reid, a railway builder of Montreal who had done



Drawn by Robert R. Brown

Map of the Newfoundland Railway

considerable work on the construction of the Canadian Pacific Railway, was awarded a contract for the construction of the Hall's Bay Railroad, extending from Placentia Jct., in a north-westerly direction to Hall's Bay. By 1893 this railway was completed as far as Norris Arm but, as the mines in the Hall's Bay district proved to be of little value, it became evident that to be of any real value it would have to be extended to Port aux Basques, the point nearest to Canada, and this accounts for the long roundabout way adopted for the cross country line. Another company known as the Newfoundland Northern and Western Railway was formed to build the extension from Norris Arm to Port aux Basques and the whole cross country line was partly completed in the autumn of 1897.

Currency has always been scarce in Newfoundland and even to-day there are practically no One or Two Dollar bills in circulation. The commonest unit is the silver Fifty Cents and almost the only paper money consists of Canadian bank notes of Five, Ten and Twenty Dollars. During the construction of the western extension, Mr. Reid, the contractor, issued notes in various denominations and these served as a convenient and stable currency; the notes were redeemed years ago which perhaps was a misfortune. This scarcity of money was responsible also for the well-known story that "outport" people often boarded the trains and tendered salt codfish in payment for their fares.

In October 1897, the steamer "Bruce" was purchased to run between Port aux Basques and North Sydney but as the railway was not yet ready for regular operation the boat ran between North Sydney and Placentia. The first through train left St. John's on Wednesday, June 29th, 1898, at 7 P. M. and arrived at Port aux Basques on Thursday at 10.45 P. M., taking 27 hours and 45 minutes. It consisted of two baggage cars, one day coach, 1 dining car and two sleepers and, during the run, seven locomotives were used.

The various railway lines had been paid for by the Government but while the main line was still under construction, in 1893, the question of operating the road presented itself for solution. On September 1st of that year, Mr. Reid, on behalf of the Reid-Newfoundland Company, contracted with the Government to operate the railway for a period of ten years in return for which his company was to receive a grant of 5000 acres of land for each mile of railway operated. In 1898, before the first contract had expired, Mr. Reid applied for an extension of fifty years; the new contract provided for an additional land grant and also stipulated that at the end of fifty years the railway would become the property of the Reid Company. In return, the Company agreed to pay to the Government One Million Dollars, establish and operate seven coastal steamship lines, build an electric street railway in St. John's and to pave Water Street in that city. This agreement aroused considerable opposition but was finally ratified by the Legislature after some of the terms had been modified and the proviso added that the Government could buy back the road at the end of fifty years for One Million Dollars, plus interest and plus a sum, to be decided by arbitration, to cover improvements to the property. The old names; Newfoundland Railway, Pla-

centia Railway, Hall's Bay Railroad, and Newfoundland Northern and Western Railway disappeared and all rolling stock was then lettered "Reid-Newfoundland Company Limited." Under the terms of this agreement a branch line from Notre Dame Jct., to Lewisport and a cut-off from Brigus Jct., to Tilton, to shorten the line to Carbonear, were built and completed in the summer of 1898.

Later on, in 1909, the Reid-Newfoundland Company entered into contracts with the Government for the construction of the following branch lines:

Shoal Harbour to Bonavista
Waterford Bridge to Trepassey
Blaketown to Heart's Content
Carbonear to Bay de Verde
Goobies to Fortune
Deer Lake to Bonne Bay

The Bonavista branch was started in 1909 and completed on November 8th, 1911. The Trepassey branch was started in 1911 and completed on January 1st, 1914 but in 1934 service was discontinued and the rails removed. The Heart's Content branch was completed in July 1915. The Bay de Verde branch was started in 1914 and completed on October 11th, 1915 and this line also was dismantled in 1934. The Fortune branch was completed from Goobies to Terrenceville, a distance of 43 miles, and was graded to Fortune but, because of the outbreak of the war, the line was abandoned. The Bonne Bay branch was graded but not completed for the same reason.

In 1920, because of increased operating costs and the operation of unprofitable branch lines, the Reid Company found itself in financial difficulties and appealed to the Government for assistance. Sir George Bury, a former Vice-president of the Canadian Pacific Railway, was engaged to investigate conditions and he recommended certain improvements and economies but principally the complete separation of the railway from the many other Reid enterprises and the appointment, by the Government, of an experienced railway executive as General Manager of the railway only. Following these recommendations, the services of Mr. R. C. Morgan were borrowed from the Canadian Pacific Railway and he was appointed, by the Government, General Manager of the Reid Company's railway, a form of dual control which naturally led to disputes and led finally to the railway being taken over, on July 1st, 1923, and operated as the Newfoundland Government Railway. In 1926 the original name, Newfoundland Railway, was restored.

When the Government took over the road it was in very poor condition; the track was rough and the old 56 pound Carnegie rails, put down more than 25 years before, were just about completely worn out. A few new locomotives had been purchased in 1920 but the rest of the rolling stock was antiquated and badly in need of repairs. Most of the locomotives were too small and of an unsuitable type; the passenger cars were all of the open platform type, did not have Miller platforms and, because of the rough rails and the almost unbelievable amount of slack in the

draught gear, were very uncomfortable to ride in. The new management set about modernizing the road, as rapidly as the slender financial resources of the Dominion would permit, and by 1930 the main line had been relaid with new 70 pound steel and ballasted with stone. On the Western Division pure white crushed limestone was used but on the Eastern Division the ballast consisted mostly of red and green sandstone pebbles gathered on the beach. About half of the new rails were bought from D. Colville & Sons, of Kilmarnock, Scotland, and the rest from the Dominion Iron & Steel Company, of Sydney, Nova Scotia. It is reported that the Canadian rails are of somewhat better quality than the ones from Scotland and are showing less signs of wear.

New locomotives and cars were purchased and older ones were repaired and modernized. The newest passenger cars are of all-steel construction and are very comfortable and to-day the Overland Limited is a fine modern train and, in spite of its small size, compares favorably with the best express trains in Canada and the United States. It usually consists of a mail car, a baggage car, one or two second class coaches, one or two first class coaches, a dining car, a standard sleeping car and an observation sleeper.

In 1936 the road had 33 locomotives in service; 4 Mikados, 10 Pacifics, 3 Consolidations and 16 ten-wheelers. Prior to the reorganization of 1898, when a new numbering series was started, there appears to have been a duplication of numbers; the engines of the original road from St. John's to Carbonear being numbered from 1 to 11 and subsequent engines for the Placentia, Hall's Bay and Western lines being numbered from 1 to 13. It is possible, however, that the survivors of the original stock were renumbered earlier than 1898 and that the newer engines were given their numbers. No official details of engines 2 to 6 of the original lot are available but it is known that some, and it is believed that all, of them were 4-4-0 tank engines built by the Hunslet Engine Company in 1872 for the Prince Edward Island Railway and bought from that road in 1882. Most of the early and the two most recent engines were built in Great Britain but the Baldwin Works supplied most of the rest. Between 1911 and 1917, 9 ten-wheelers and 2 Consolidations were built in the St. John's shops of the Reid-Newfoundland Company and good engines they were too as most of them are still in service. Previous to 1920 the cross country passenger trains were hauled by two of the ten-wheelers or by one of the consolidations but in that year the first of the Pacifics appeared, and they gave great satisfaction until the all-steel passenger cars were introduced and double-heading again became necessary. At present the express trains are hauled by the Mikados and the Pacifics are handling the branch line and through freight trains. The three consolidations are working the ore trains between Buchans Mines and Bishop's Falls. The ten-wheelers handle some of the branch line trains, the way freights, work trains, several are used as shunters and some are out of service, but still serviceable.

On the cross country passenger run, engines formerly were changed at Clarenville, Bishop's Falls and Humbermouth, giving each of the four engines about 150 miles. Now, however, they are changed at

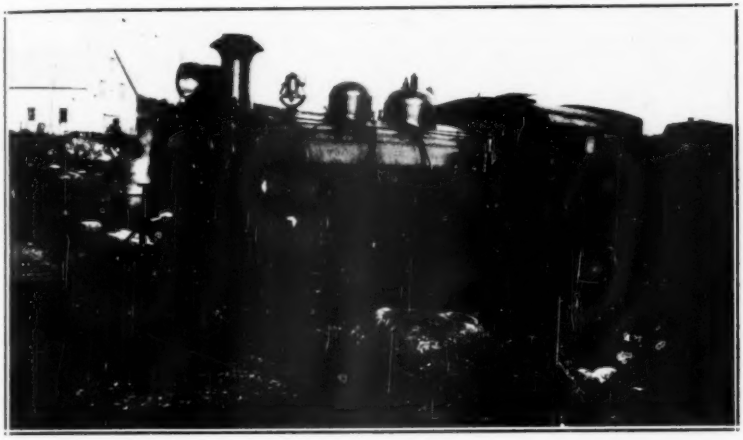
Bishop's Falls as only two are required for the trip. No extraordinary speed is made and the average for the Overland Limited, including stops, is little more than 20 miles per hour and the actual running speed seldom exceeds 35. It is recorded, however, that on November 1st, 1901 a special train hauled by a 4-4-0 type engine, built in 1891, ran from St. John's to Brigus Jct., 41.75 miles in 50 minutes and, in view of the rough, mountainous country and the astonishing curves, it was a remarkable performance and undoubtedly the train crew felt relieved when they arrived intact.

The road owns about 80 passenger and baggage cars; including three all-steel observation sleepers, built by the National Steel Car Company, of Hamilton; three steel frame standard sleepers and three dining cars, built by the Jackson, Sharp Works of the American Car and Foundry Company, Wilmington, Del. The rest, including six old wooden sleeping cars, now out of service, first and second class day coaches, baggage and mail cars, several official cars and one school car, were built in the St. John's shops. The school car is a fully equipped school, with a teacher supplied by the Department of Education, and it moves up and down the line, stopping for certain periods at various remote points for the benefit of the children of railway employees.

The seats in the passenger cars are about 34 inches wide and, while they are a tight fit for two fat people, they are quite comfortable. The berths in the sleepers are about 6 feet 3 inches long by about 34 inches wide and in the lower berths there is almost as much head-room as in a standard gauge car. There are eight sections, one compartment, a combined smoking room and wash room for men and a dressing and wash room for women. The trucks on all passenger cars are fitted with outside bearings, similar to those used on the Pennsylvania Railroad, and, in spite of the narrow gauge, there is no swaying.

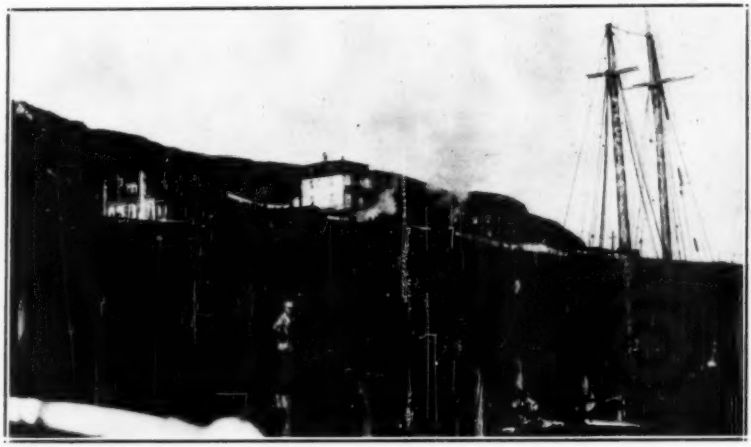
There are over 1000 freight cars and until recently all of them were built in the St. John's shops, most of them being box cars of 20 tons capacity. In 1929, the Magor Car Corporation, of New York, and the Koppel Industrial Car and Equipment Company, of Koppel, Pa., each supplied twenty-five 20 ton ore cars to the Buchans Mining Company and five years later the Magor Car Corp., supplied the frames, trucks and fittings for fifty 30 ton box cars for the government road. These were assembled and completed in St. John's and put in service in December 1934. The Koppel Company supplied 50 similar cars in November 1935 and another 50 in November 1936. These new box cars are used, principally, to carry paper from the mills at Grand Falls and Corner Brook. This traffic has become so heavy during the past few years that all employees laid off during the depression have been recalled and a few student firemen and brakemen have been taken on.

Winter conditions are very severe especially as the damp climate causes a thick and very hard, icy crust to form on the surface of the snow and in the old days this crust and snowdrifts, anywhere from ten to twenty feet deep could, and frequently did, stall the small wedge plows used then, and trains were blocked sometimes for as long as two weeks. When the government took over the road, three large rotary

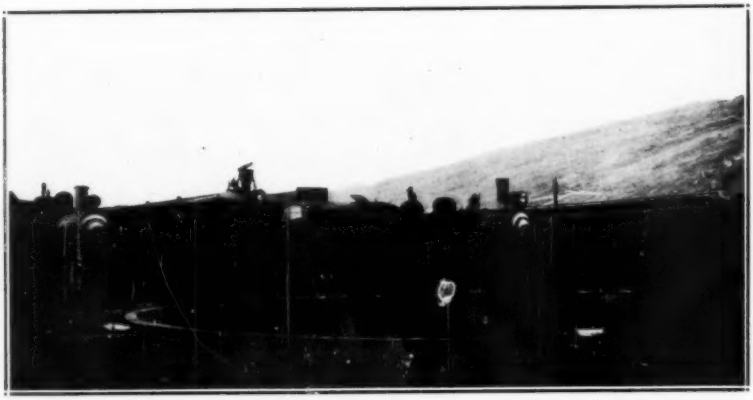


Newfoundland Railway, Engine 191, 4-6-2, 17x24 52", 113000#, Baldwin 1920.
Old style smoke stack.

Newfoundland Railway, St. John's Yards. Engines 125 and 197, Steam Coaches A and D.



Newfoundland Railway, Port aux Basques Wharf
Engine 198, 4-6-2, 18x24 52", 123900#, Schenectady, 1929.



Newfoundland Railway, St. John's Yard.

plows were bought, many miles of snow-fences were built, and since then there has been very little trouble. In the old days, avalanches of snow caused considerable damage and on one occasion carried a train far down the side of a hill. The engine was completely buried but the crew survived their temporary burial and the engineer is now Roundhouse Foreman at St. John's.

About 1923, two steam motor coaches were bought in England for suburban service; one to run between St. John's and Bowring Park, and the other from Humbermouth to Curling. They had passenger accommodation only and were really steam interurban cars. They are articulated about 8 or 10 feet from the front end; the reason being that the front wheels, which are the driving wheels, are not in the form of a truck but are rigidly attached to the forward part of the car body. The vertical high pressure boiler and the engine are in the short forward section and the drive is by means of chains and sprockets. A second type, of which there were three, came out several years later, about 1928, and had passenger and limited baggage accommodation. They were driven by a six cylinder, high pressure steam engine mounted horizontally under the car body and connected to the forward truck by means of a transmission shaft. The bodies were built by the Sentinel Wagon Company and the machinery by Cammell, Laird and Company. These cars worked well enough but they were not suited to the traffic requirements and they have been retired; four of them are still serviceable but it is doubtful if they will ever run again.

Last, but by no means least, the dining car service is excellent; the cars are new and radio-equipped; the meals are a bit expensive but the food is good; a change from the old days when about all one could get was codfish and no longer does the steward put his head in the door and bellow, "Dinner's ready, come and get it." Not only in the dining cars but in all branches of the service one is impressed by the efficiency and politeness of the employees and the latter characteristic might be copied, to advantage, by the employees of some of the larger roads.

The Newfoundland Railway also operates a large fleet of coastal steamships, including the "Caribou" which plies between Port aux Basques and North Sydney, and a very large dry dock in St. John's. The repair shops were formerly located at Whitbourne but were moved to St. John's many years ago and, in 1930, new and modern buildings were erected. They are fully equipped to handle all repairs to the rolling stock and all kinds of marine repair work.

In addition to the government road there are two short railways owned by the Anglo-Newfoundland Development Company, which operates the large paper mill at Grand Falls and the zinc, lead and copper mine at Buchans. The line from Millertown Jct., to Millertown was built about 1900 by a lumberman named Miller, it was bought by the A.N.D. about 1910 and in 1927 it was extended to Buchans. On this branch there are two 4-6-0 type engines, lettered "Buchans Mining Company" (a subsidiary of the A.N.D.), several passenger cars, two converted automobiles and 50 ore cars. The ore trains are handled by government engines and crews between Buchans and Bishop's Falls and by

A.N.D. engines and crews between Bishop's Falls and the port of Botwood. The other A. N. D. line runs from the paper mill at Grand Fall to Botwood and crosses the main line at Bishop's Falls. It has two ten-wheelers, 3 or 4 tank engines and a considerable number of box and platform cars.

When the paper mill at Corner Brook was being built about 1924, nine old Prince Edward Island Railway locomotives were bought from the Canadian National Railways; Nos. 10, 18, 19, 26 and 27 were 4-4-0 type built by the Canadian Locomotive Company in 1904 and Nos. 28, 29, 30 and 31 were 4-6-0 type built by the same company in 1907. These engines were nearly worn out and did not last long and now the International Paper Company has several small tank engines for shunting around the mill yard.

PRINCIPAL SOURCES OF INFORMATION:

Official Reports
Baldwin Locomotives
Encyclopaedia Britannica

LOCOMOTIVES OF THE NEWFOUNDLAND RAILWAY

Orig. No.	1898 No.	Type	Cyls.	Dr.	Built	Builder	
1		0-6-0T	8x12	27	1882	Hawthorn, Leslie	Sold to A.N.D.
2		4-4-0T	10x16	42	1872	Hunslet	Ex PEIR #3 (1882)
3		4-4-0T	10x16	42	1872	Hunslet	Ex PEIR #4 (1882)
4		4-4-0T	10x16	42	1872	Hunslet	Ex PEIR #5 (1882)
5		4-4-0T	10x16	42	1872	Hunslet	Ex PEIR #6 (1882)
6		4-4-0T	10x16	42	1872	Hunslet	Ex PEIR #7 (1882)
7	20	2-6-0	13x18	40	1882	Hawthorn, Leslie	
8	21	2-6-0	13x18	40	1882	Hawthorn, Leslie	
9	22	2-6-0	13x18	40	1882	Hawthorn, Leslie	
10	23	2-6-2	14x20	42	1888	Hawthorn, Leslie	
11		2-6-0	13x18	40	1882	Hawthorn, Leslie	
2		4-4-0	14x18	48	1889	Baldwin	Placentia Ry.
3	41	4-4-0	14x18	48	1891	Baldwin	Hall's Bay R. R.
4	60	2-6-0	16x20	44	1891	Baldwin	Hall's Bay R. R.
5	42	4-4-0	14x18	48	1891	Baldwin	Hall's Bay R. R.
6	61	2-6-0	16x20	44	1893	Baldwin	
7	40	4-4-0	14x18	48	1893	Baldwin	
8	8	2-4-2T	14x18	44	1893	Baldwin	
9	9	2-4-2T	14x18	44	1893	Baldwin	
10	10	0-4-2T	9x16	33	1894	Baldwin	Nfld. N. & W. Ry.
11	62	2-6-0	16x20	44	1894	Baldwin	Nfld. N. & W. Ry.
12	105	4-6-0	16x20	44	1897	Baldwin	
13	102	4-6-0	16x20	44	1897	Baldwin	

It is likely that first Nos. 7, 8, 9 and 10 were renumbered in 1893 and there must have been an earlier No. 10 and a second No. 1 but of these there is no record.

New Series of Numbers started in 1898

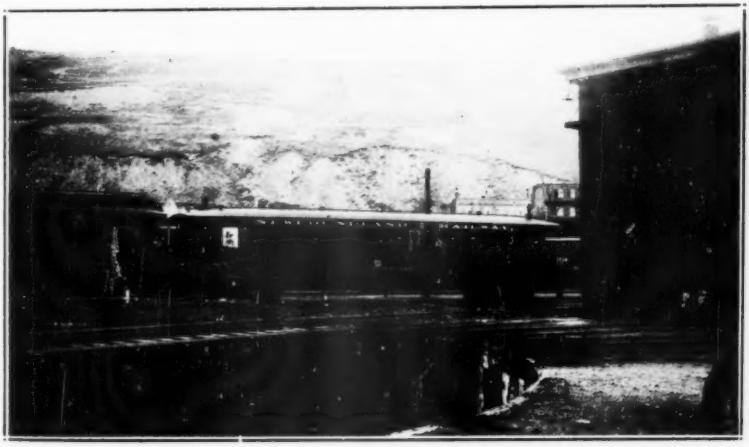
First No.	1898 No.	Re-No.	Type	Cyls.	Dr.	Built	Builder	In Service 1936
8	8		2-4-2T	14x18	44	1893	Baldwin	
9	9		2-4-2T	14x18	44	1893	Baldwin	
10	10		0-4-2T	9x16	33	1894	Baldwin	
7	20		2-6-0	13x18	40	1882	Hawthorn, Leslie	
8	21		2-6-0	13x18	40	1882	Hawthorn, Leslie	
9	22		2-6-0	13x18	40	1882	Hawthorn, Leslie	
10	23		2-6-2	14x20	42	1888	Hawthorn, Leslie	
7	40		4-4-0	14x18	48	1893	Baldwin	
3	41		4-4-0	14x18	48	1891	Baldwin	
5	42		4-4-0	14x18	48	1891	Baldwin	
4	60		2-6-0	16x20	44	1891	Baldwin	
6	61		2-6-0	16x20	44	1893	Baldwin	
11	62		2-6-0	16x20	44	1894	Baldwin	
	100	1	4-6-0	16x20	44	1898	Baldwin	#
	101		4-6-0	16x20	44	1898	Baldwin	
13	102		4-6-0	16x20	44	1897	Baldwin	
	103		4-6-0	16x20	44	1898	Baldwin	
	104		4-6-0	16x20	44	1898	Baldwin	
12	105		4-6-0	16x20	44	1897	Baldwin	
	105	125	4-6-0	16x20	44	1899	Baldwin	
	106		4-6-0	16x20	44	1899	Baldwin	
	107		4-6-0	16x20	44	1899	Baldwin	#
	108		4-6-0	16x20	44	1899	Baldwin	#
	109		4-6-0	17x22	44	1907	Baldwin	#
	110		4-6-0	17x22	44	1907	Baldwin	
	111		4-6-0	17x22	44	1911	Baldwin	
	112		4-6-0	17x22	44	1912	Reid-Nfld. Co.	#
	113		4-6-0	17x22	44	1912	Reid-Nfld. Co.	#
	114		4-6-0	17x22	44	1912	Reid-Nfld. Co.	#
	115		4-6-0	17x22	44	1913	Reid-Nfld. Co.	#
	116		4-6-0	17x22	44	1913	Reid-Nfld. Co.	#
	117		4-6-0	17x22	44	1914	Reid-Nfld. Co.	#
	118		4-6-0	17x22	44	1914	Reid-Nfld. Co.	#
	119		4-6-0	17x22	44	1915	Reid-Nfld. Co.	#
	120		4-6-0	17x22	44	1915	Reid-Nfld. Co.	#
	121		4-6-0	17x22	44	1917	Baldwin	#
	122		4-6-0	17x22	44	1917	Baldwin	#
	123		4-6-0	17x22	44	1917	Baldwin	#
	124		4-6-0	17x22	44	1917	Baldwin	#
	150		2-8-0	18x24	48	1902	Baldwin	
	151		2-8-0	18x24	48	1902	Baldwin	#
	152		2-8-0	18x24	48	1916	Reid-Nfld. Co.	#
	153		2-8-0	18x24	48	1916	Reid-Nfld. Co.	#
	190		4-6-2	17x24	52	1920	Baldwin	#
	191		4-6-2	17x24	52	1920	Baldwin	#
	192		4-6-2	17x24	52	1920	Baldwin	#
	193		4-6-2	17x24	52	1920	Baldwin	#
	194		4-6-2	17x24	52	1920	Baldwin	#
	195		4-6-2	17x24	52	1920	Baldwin	#
	196		4-6-2	18x24	52	1926	Baldwin	#
	197		4-6-2	18x24	52	1926	Montreal	#
	198		4-6-2	18x24	52	1929	Schenectady	#
	199		4-6-2	18x24	52	1929	Schenectady	#
	1000		2-8-2	18x24	48	1930	Schenectady	#
	1001		2-8-2	18x24	48	1930	Schenectady	#
	1002		2-8-2	18x24	48	1936	North British	#
	1003		2-8-2	18x24	48	1936	North British	#

Condensed Time Table

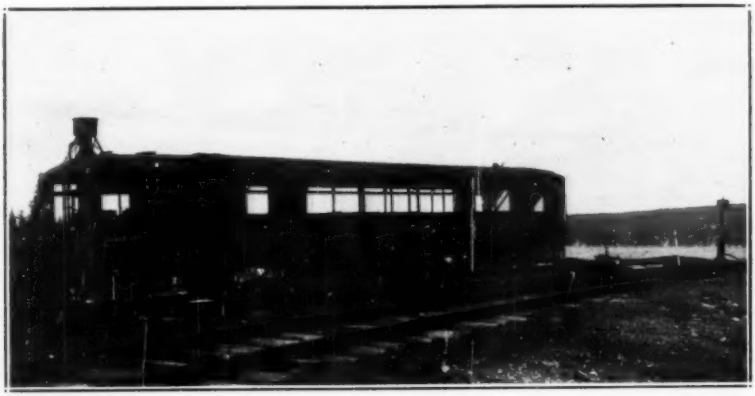
	Westbound	Overland Limited	Express
0	Lv. St. John's	10.00 A.M. Sun.	5.00 P.M. Tues. & Thurs.
42	Ar. Brigus Jct.	11.33 A.M. Sun.	6.50 P.M. Tues. & Thurs.
55	Ar. Whitbourne	12.08 P.M. Sun.	7.30 P.M. Tues. & Thurs.
131	Ar. Clarenville	3.20 P.M. Sun.	11.15 P.M. Tues. & Thurs.
267	Ar. Bishop's Falls	8.50 P.M. Sun.	5.40 A.M. Wed. & Fri.
276	Ar. Grand Falls	9.20 P.M. Sun.	6.25 A.M. Wed. & Fri.
404	Ar. Humbermouth	2.25 A.M. Mon.	12.30 P.M. Wed. & Fri.
405	Ar. Corner Brook	2.40 A.M. Mon.	12.55 P.M. Wed. & Fri.
547	Ar. Port aux Basques	8.30 A.M. Mon.	8.00 P.M. Wed. & Fri.
	Lv. Port aux Basques	9.30 A.M. Mon.	9.00 P.M. Wed. & Fri.
	Ar. North Sydney	6.00 P.M. Mon.	6.00 A.M. Thurs. & Sat.
	Lv. No. Sydney (CNR)	7.57 P.M. Mon.	7.25 A.M. Thurs. & Sat.
	Ar. Montreal	8.00 A.M. Wed.	6.45 P.M. Fri. & Sun.
	Ar. Boston	6.55 A.M. Wed.	6.55 A.M. Sat. & Tues.
	Eastbound		
	Lv. Boston	9.30 P.M. Sun.	9.30 P.M. Tues. & Thurs.
	Lv. Montreal	8.00 P.M. Sun.	8.00 P.M. Tues. & Thurs.
	Ar. North Sydney	5.55 A.M. Tues.	5.55 A.M. Thurs. & Sat.
	Lv. North Sydney	8.30 A.M. Tues.	8.30 P.M. Thurs. & Sat.
	Ar. Port aux Basques	6.30 P.M. Tues.	6.00 A.M. Fri. & Sun.
	Lv. Port aux Basques	7.30 P.M. Tues.	7.45 A.M. Fri. & Sun.
	Ar. Corner Brook	1.17 A.M. Wed.	2.50 P.M. Fri. & Sun.
	Ar. Humbermouth	1.25 A.M. Wed.	3.00 P.M. Fri. & Sun.
	Ar. Grand Falls	6.25 A.M. Wed.	9.55 P.M. Fri. & Sun.
	Ar. Bishop's Falls	7.00 A.M. Wed.	10.30 P.M. Fri. & Sun.
	Ar. Clarenville	12.25 P.M. Wed.	5.30 A.M. Sat. & Mon.
	Ar. Whitbourne	3.35 P.M. Wed.	9.17 A.M. Sat. & Mon.
	Ar. Brigus Jct.	4.06 P.M. Wed.	9.59 A.M. Sat. & Mon.
	Ar. St. John's	6.00 P.M. Wed	12.00 Noon Sat. & Mon.

Several recent and very comfortable trips over the Newfoundland Railway bring to mind another trip made some years ago, in the good old days of light engines, wooden coaches and slack couplings, when, for two long days the passengers were marooned in an antiquated and uncomfortable slim gauge sleeper. Trains on other roads might be delayed by floods or wrecks but in Newfoundland, in years gone by, when the autumn gales blew in from the sea, the trains sometimes had to run to sheltered spots where, hove to and chained to the track, they would ride out the storm. The trip in question was made in the early part of November 1927; the train left St. John's at 5 o'clock on a cold and dreary Thursday afternoon and it was due to arrive at Port Aux Basques at 7.00 P. M. Friday. All went well until it arrived at St. Andrews, just 20 miles from Port aux Basques; but, as the train remained at the station an unusually long time, questions were hurled at the conductor who finally admitted that a gale was blowing, further down the line; that it was dangerous to proceed, and until the gale blew itself out, the train would have to remain where it was. During the night the force of the wind gradually increased and the roar of the storm and the violent rocking of the cars prevented the passengers from sleeping. Saturday morning dawned clear and sunny but the wind continued to increase finally reaching the force of a hurricane. The cars were of the old open platform type and it was dangerous to cross from one car to another; one man

Newfoundland Railway. Old Snow Ploughs. Note link and pin couplings.



Newfoundland Railway, Old Type of Passenger Car.



Newfoundland Railway Steam Coach B, Articulated Type.

Port aux Basques Western Terminus of the Newfoundland Railway.

actually was blown off and dropped into a big puddle in the ditch at the side of the track. By noon the cars were swaying dangerously and, as the wind was still increasing, the train was run slowly and carefully down the line about one mile, to a densely wooded valley, where it stopped; special chains, carried for just that purpose, were attached to the under sides of the car bodies and hooked under the rails and, thus securely anchored, the train rode out the storm. Saturday evening it was found that the storage batteries were so run down that the passengers were forced to sit in the dark with no other pastime than to listen to a fisherman sing, in the most lugubrious fashion, the first bar of "It Aint Goin' to Rain No More, No More." It was unanimously decided that murder is sometimes justifiable.

The storm reached its maximum about 2 A. M. Sunday morning but by breakfast time the wind had diminished sufficiently for the removal of the chains and a little later the train backed to the station. By mid-afternoon it was comparatively calm but the telegraph wires were down and there was no means of communicating with the dispatcher. However about four o'clock in the afternoon the telegraph linemen came through on a gasoline speeder with orders for the train to proceed to Cape Ray, 9 miles from Port aux Basques, and stop there for further orders. At several points there were box cars on sidings propped up with telegraph poles or old ties but even this did not prevent some of them from turning over. Midway between Cape Ray and Port aux Basques the line crosses Grand Bay on a long dump and there the wind had been so strong that the ballast had been blown out from under the track, which had dropped as much as two feet in places. About 100 men were busily engaged in jacking up the track and putting old ties and wooden shims underneath and, after some further delay, the train crossed very cautiously and arrived at Port aux Basques about 6 P. M. The passengers then changed to the s. s. Caribou but it was so rough outside the harbour the boat did not leave until 8 o'clock the following morning. Further grief awaited the passengers at North Sydney as the ferry boat for Sydney left a few minutes before the arrival of the Caribou, thus causing another wait of two hours until the next ferry. Finally the passengers staggered into the hotel at Sydney about 6 o'clock Monday evening, which happened to be the Canadian Thanksgiving Day, 56 hours late and just in time for a greatly appreciated Thanksgiving dinner.

The Rogers Locomotive "Sandusky"

ONE hundred years ago (October 3, 1837) the first locomotive built at the famous Rogers works made its initial run on the tracks of the Paterson and Hudson River Railroad to Jersey City and thence on the tracks of the New Jersey Railroad and Transportation Company to New Brunswick, and return.

This engine was the forerunner of several thousand locomotives that were built in Paterson and brought untold wealth and fame to that city.

A complete description of the trip was printed in the New York *Evening Star*, Wednesday, October 4, 1837 as follows:

"NEW LOCOMOTIVE

"We yesterday witnessed the trial of a new locomotive engine, made at the factory of Rogers, Ketchum, and Grosvenor at Paterson, which came down at an early hour to the depot of the Newark railroad (at Jersey City) where a large party from Paterson and New York had assembled to witness its performance. Locomotives were originally imported from England, but in a short time, such is the ingenuity of our mechanics that not only do we manufacture them in this country, but have made such improvements both in lightness, simplicity, and the temper and character of the materials, that our locomotives may now be considered the best in the world, and we much doubt whether the new one called the "SANDUSKY," made in Paterson, and on trial yesterday, could possibly be rivalled in any country, and as a most remarkable circumstance Mr. Rogers, the machinist of the above firm, never made one before this, and when it was completed, and rolled out of the workshop, and her steam raised, she went off on the railroad with the expedition and ease of an old engine, not a nut or a screw required adjustment or altering.

"There are various improvements in the engine which we cannot well describe—the position and structure of the wheels and arrangement of the springs, render the machine lighter, and more free than other locomotives, and she has a steam whistle to frighten the cows from the rails—call the passengers together and act as an alarm, which is of peculiar shrillness, and is heard at a considerable distance.

"The locomotive started with one double Paterson car, well filled with the enterprising citizens of that place, and another car with New Yorkers, and passed over the new bridge on the Passaic and reached the depot in Newark where the company was joined by a number of amateurs, who were anxious to witness the experiment. (Who said there were no railroad enthusiasts in those days?! W.A.L.) The fair start was from Newark, on what is called the T rail being the strongest and on the most level piece of road.

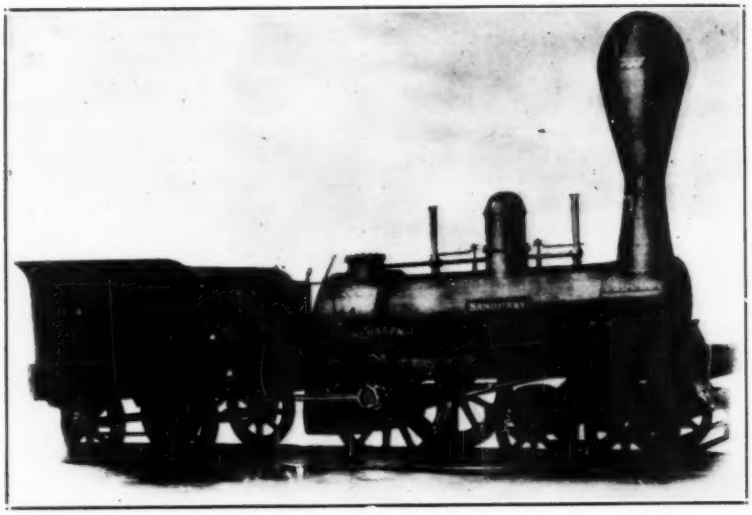
"The Sandusky was continually blowing off her steam as the lightness of the load would not permit the trial to go to the extent of her speed.

"The time by a stop watch, was accurately kept: From Newark to Elizabethtown, five miles, eleven minutes; from Elizabethtown to Rahway five and one-half miles, eleven minutes; Rahway to New Brunswick, eleven miles, twenty-four minutes, making in all twenty-two miles in forty-six minutes—single miles two minutes seven seconds, two minutes two seconds, and on returning, the five and one-half miles from Elizabethtown to Newark were performed in nine minutes. This, to be sure, has been performed frequently, but for a new engine with suppressed speed is as fast as could be desired, and fully tested the excellence of the machine.

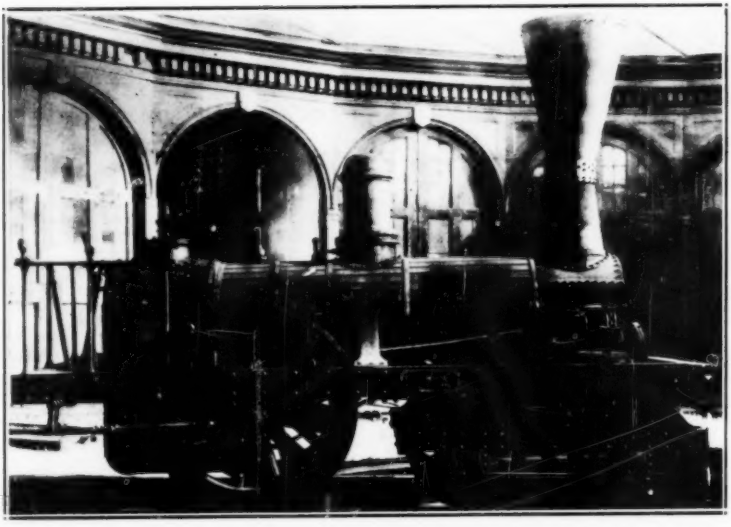
"At New Brunswick, we found the new bridge over the Raritan nearly finished, and in a few weeks will be ready for cars. It is the most perfect of the kind in New Jersey and we doubt if there is any in the country can equal it. The length 1,700 feet—the height above the river 50 feet—there are twenty stone piers and abutments—two draws thirty feet each, and the whole finished with Doric capitals. There are two passageways on this bridge—the one below for carriages and passengers and the one above for the railroad cars, which pass over the tinned roof. The whole

Rogers Works in 1860—Paterson, N. J.

The stone building on the left was erected in 1835 to accommodate the work of building locomotives. This view is looking south on Spruce St.,—Congress St. now called Market St. begins at the left. Although this picture was taken in 1860 the old name of the company still appears on the sign, ROGERS, KETCHUM & GROSVENOR. None of these buildings on either side of the street are standing today, 1937.



Copy of half tone of "Sandusky."



Rogers K. & G. First Engine "SANDUSKY" built for the Mad River and Lake Erie R. R. Oct. 3, 1837.
Photo of full size wooden model owned by B. & O.

finished in a most durable manner by Sykes, engineer, and Mr. Thomas Hassard, builder, at an expense of about $120,000.

"The company at (New) Brunswick partook of a plentiful and handsome collation, at which the song, and the story, and patriotic toasts abounded, and returned to the city in the afternoon of a splendid autumnal day, very much gratified with their excursion.

"Hereafter, when there are no dangers to contend against, we trust these agreeable and useful amusements will be attended by the ladies. All such invitations should be made to include their company."

The Newark *Daily Advertiser* of Friday, October 6, 1837 commenting on this trial trip of the first locomotive built in Paterson said:

"The Sandusky, made at the factory of Messrs. Rogers, Ketchum and Grosvenor, in Paterson, and which made a successful trip on the New Jersey railroad to New Brunswick, on Tuesday, is spoken of by some disinterested persons as superior to any heretofore brought into use in this country.

"It is Mr. Rogers' first attempt of the kind, and was made at the instance of the Mad River and Lake Erie Railroad company—the workmen, (of which there are three hundred in the factory), having been taken from other descriptions of machinery. It weighs nine tons. Another is now advanced at this establishment, for the New Jersey Railroad.

"An ingenious mechanic of this city (Newark), Mr. Seth Boyden, has also recently entered upon an experiment in this branch of machinery. His first locomotive is now we believe, in successful use on the Morris and Essex road."

The Sandusky was a locomotive with cylinders eleven inches in diameter and sixteen inches stroke. The driving wheels were four feet six inches in diameter, and the track gauge four feet ten inches.

Mr. Rogers conceived the idea of building locomotives in 1835 when he assembled the first engine used on the Paterson and Hudson River Railroad. This locomotive had been constructed in England by Robert Stephenson, and Co. of Newcastle upon Tyne. It was brought to this country in April of that year, taken to Paterson in its unassembled state and put together by Mr. Rogers with the aid of his Paterson mechanics. Some of the men who worked on this machine were William Swinburne, Thomas Hogg, John Royle and Timothy Smith.

After successfully assembling this machine Mr. Rogers literally copied it with improvements suggested by the experience of its users. Over a year and a half of time was required to build his first engine, the Sandusky, but it was built so well that it continued in use on the Mad River and Lake Erie Railroad many years.

Thomas Rogers was a pioneer manufacturer in Paterson. He came to this city from Connecticut in 1812. In 1819 he joined with John Clark and formed the shop of Clark and Rogers, makers of spinning machinery. A general machine shop and millwright business was conducted as well. In 1820 he took in partnership Abraham Godwin Jr., and the firm became Godwin, Rogers and company. They then commenced the spinning of cotton as well as making machinery.

In 1831 Mr. Rogers withdrew from this partnership and in November of that year associated himself with Morris Ketchum, and Jasper Grosvenor under the firm name of Rogers, Ketchum and Grosvenor. Mr. Rogers was in reality the firm, Mr. Ketchum and Mr. Grosvenor being the financial backers.

Their shops were located on Spruce street at the foot of Market street, formerly known as Congress street. With the advent of the building of the Paterson and Hudson River Railroad for whom they made iron work to be used in bridge construction, the opportunity to build locomotives presented itself and they continued in this until July 1913 when the last engine was turned out of the Rogers works.

Thomas Rogers died in 1856 and the company was reorganized as the Rogers Locomotive and Machine Works with the son of the founder, Jacob Rogers, as head. This continued until 1901 when Jacob Rogers died. The shops were sold to the American Locomotive company in 1904 which operated them until they were disposed of in 1926. From 1913 to 1926 no locomotives were built, the buildings stood idle and a few used as store houses for spare parts of engines.

The Mad River and Lake Erie R. R. was chartered in 1832 to connect Lake Erie and the Ohio river by way of Sandusky, Springfield and Cincinnati. Fifteen miles of track were in use by 1839 and the Sandusky was the first engine to run over it, in fact she was one of the first locomotives west of the Allegheny Mountains.

The Mad River and Lake Erie R. R. became successively the Sandusky, Dayton and Cincinnati—Columbus, Springfield and Cincinnati—Indianapolis, Bloomington and Western and then part of the Cleveland, Cincinnati, Chicago and St. Louis, now the N. Y. C. System.

AMERICAN LOCOMOTIVES.

By the following advertisement, we learn—and it affords us pleasure to call to it the attention of our readers interested in Railroads —that Messrs. ROGERS, KETCHUM & GROSVENOR, of Patterson, New-Jersey, have added to their extensive machine shops, one for LOCOMOTIVE ENGINES.

We have more than once enjoyed the pleasure of a visit to their works, where we found ample evidence of the truth of a remark often made by us, that, "to whatever branch of manufacture our countrymen turn their attention, they are sure to excel"—and so, we doubt not, it will be in this new branch of business, undertaken by this enterprising House—and we hope soon to learn, that their skill in this branch has been as successful as in others.

In a few years, we shall not see an imported Locomotive on an American RAILROAD.

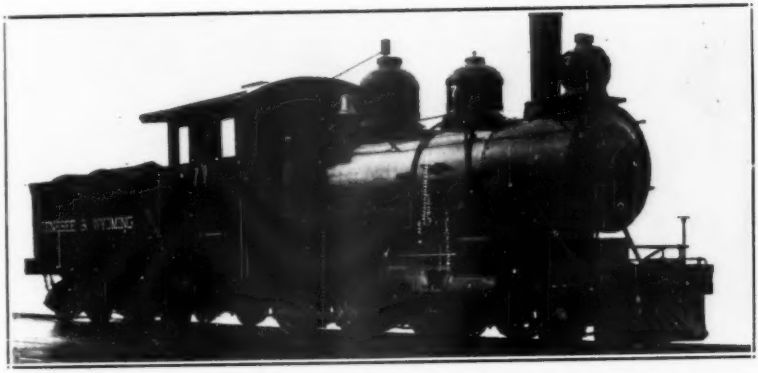
MACHINE WORKS OF ROGERS

KETCHUM AND GROSVENOR, Paterson, New-Jersey. The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

RAILROAD WORK.

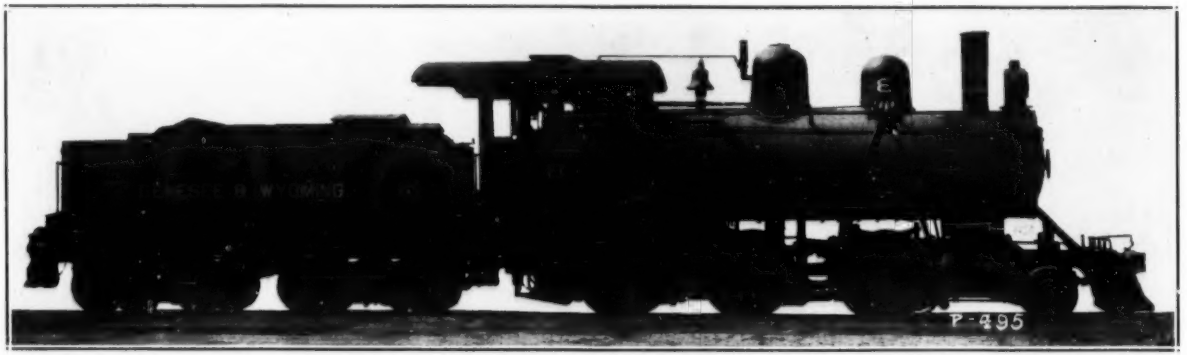
Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires; Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron; Springs; Boxes and Bolts for Cars; Cotton, Wool and Flax.

Name plate of red sand stone in building built in 1871 as an erecting shop for locomotives.
The outline of the doorways can readily be seen, where they brought out the completed engines. This erecting shop stands on the same plot of ground on Spruce St. as the stone building and the wooden one adjacent in previous picture.
The name plate is located about where the base of the bell tower is on the wooden building.
Photo September, 1937.



Courtesy of American Locomotive Co.

Genesee & Wyoming R. R. #7. Schenectady, 1905.



Genesee & Wyoming R. R. #8. Brooks. 1907. Courtesy of American Locomotive Co.

Machinery of all descriptions and of the most improved Patterns, Style and Workmanship.

Mill Geering and Millwright work generally; Hydraulic and other Presses; Press Screws; Callenders; Lathes and Tools of all kinds, Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
Patterson, New-Jersey, or 60 Wall street, N. Y.

[ROGERS FIRST ADVERTISEMENT CONCERNING LOCOMOTIVE BUILDING. From the *American Railroad Journal*, December 24, 1836.]

Genesee and Wyoming

By CAPT. WINFIELD W. ROBINSON

CHARTERED April 27, 1891 as the Genesee & Wyoming Valley Railway Company, with authority to construct and operate a single track standard gauge steam railroad from the village of Perry, Wyoming County, to the village of Caledonia, Livingston County, New York, with a branch from the main line in the township of York to a connection, to be known as Retsof Junction, with the Western New York & Pennsylvania Railroad Company near the village of Piffard. Total mileage 25.

Annual report for the year 1897 shows a portion of the main line completed from the D. L. & W. depot at Greigsville to Pittsburgh and Lehigh Junction in the township of Caledonia, 12 miles, and the branch from Retsof to Retsof Junction, 3 miles. Total deficit to the end of the year $107,263. Executive offices at 146 Broadway, New York City, operating offices at Retsof.

Due to financial difficulties the road was not operated from July 1, 1898 to November 15, 1898, at which date, upon request of the bondholders, David Hyman of Buffalo was appointed Receiver by the Supreme Court, and he operated the road to March 20, 1899.

The property of the G. & W. V. Railway was sold under foreclosure March 7, 1899 and was purchased by representatives of the International Salt Company of Scranton, Penna., owner of the salt mines in the central portion of Livingston County, which are worked under the name of the Retsof Mining Company. Thereupon the railway was reorganized as the Genesee & Wyoming Railroad Company, which immediately took over operation, the receiver being discharged by the court. The new company was chartered April 27, 1899, with executive offices at Scranton, the operating department remaining at Retsof.

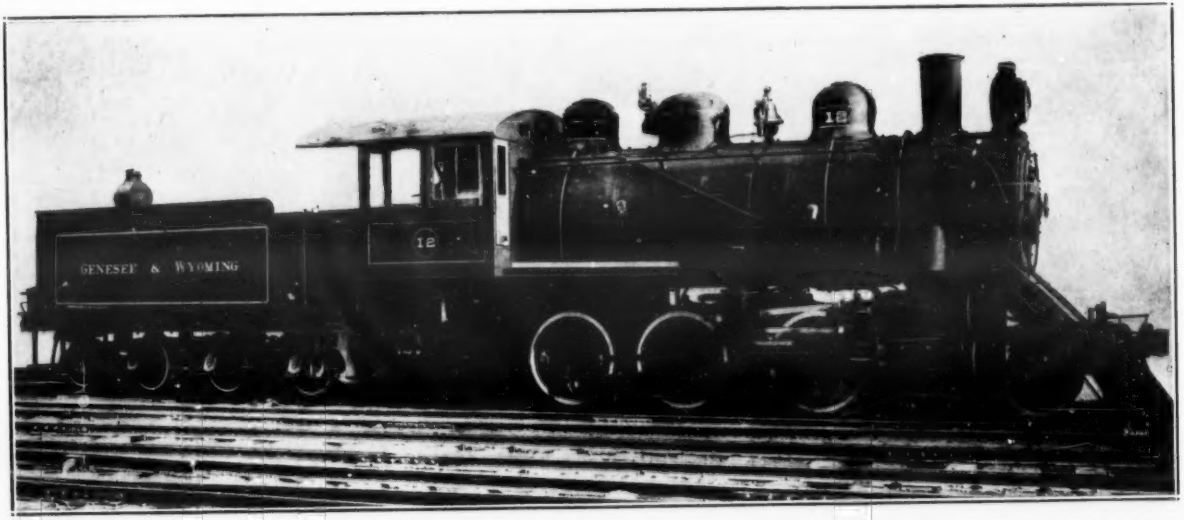
The original plan of having the southern terminus of the road at Perry was changed and instead, under the charter of the Halite & Northern Railroad Company, there was constructed, in 1911, a southern extension of the main line from Retsof to Halite, 3.2 miles, where the company had a large salt mine. This made a total mileage of main line, branches and sidings of about 20 miles.

This road has shown a substantial net profit every year for over twenty years and is today in an excellent financial condition. Road bed, equipment, buildings, etc., are of the best. The principal traffic is salt from the mines of the company in the vicinity of Retsof, although the road operates as a common carrier and has a small volume of outside freight traffic. It has connections with the Lackawanna at Greigsville, with the Pennsylvania at Piffard, with the Erie at West Caledonia, and with the New York Central, Lehigh Valley and the Buffalo, Rochester & Pittsburgh (B. & O.) at P. and L. Junction. Two round trips are made daily by freight trains. Passenger service was abandoned several years ago and the depots at Retsof, York Center, Fowlerville and Taylor were closed. Formerly a passenger train left Greigsville in the morning connecting at P. & L. Jct., with a train for Rochester on the B. R. & P., leaving the junction at six o'clock upon arrival there of the evening train from Rochester.

The building at Retsof containing the offices of the railroad company and the original passenger depot was burned about twenty years ago and all the records were destroyed. The accompanying locomotive roster, in so far as the early engines are concerned, has been prepared from private memoranda and the memory of Harvey C. Finch who commenced with the G. & W. V. as Chief Clerk in the general offices, later becoming Auditor, General Freight and Passenger Agent, General Manager, and who is now Vice President of the G. & W.

The writer is also indebted to Andrew D. Donohoe, Master Mechanic of the railroad, for locomotive data and assistance.

This is the seventh article that the writer has prepared for the bulletins of the society and it seems about time that credit should be given where much credit is due, and that is to J. Howard Wagar, Manager of the Photographic Department of the American Locomotive Company at Schenectady. He has always been most willing to furnish locomotive photographs to illustrate the articles. He has undoubtedly spent hours patiently searching through the records of the Dickson, Rogers, Cooke, Brooks, Pittsburgh and Schenectady companies to get for me data on long forgotten locomotives. Without his generous help these historical articles never could have been made complete.



Genesee & Wyoming R. R. #12. Porter, 1916.

Courtesy of H. K. Porter Co.

LOCOMOTIVE ROSTER

GENESEE AND WYOMING VALLEY RAILWAY COMPANY — GENESEE AND WYOMING RAILROAD COMPANY

No.	Builder	Shop	Year	Type	Cyls.	Wheels	Weight	Purchased From	Disposition
1	Baldwin		1891	0-6-0-T					Sold in 1892 or 1893
2	Baldwin		1892	0-4-0			74,000	Baldwin Locomotive Works 1892	Scrapped
3	Baldwin		1893	0-4-0			74,000	Baldwin Locomotive Works 1893	Scrapped
4	L. V. R. R.		1884	4-4-0	19x26	60"	110,320	Leased from the Lehigh Valley Railroad in 1895	Returned to L. V. R. R. 1898
5	Dickson	272	1880	2-6-0	18x24	55¾"	83,300	(Delaware & Hudson Co., 1900 (Note D	Scrapped in 1908
6	L. V. R. R.		1888	4-6-0	18x26	55½"	86,000	Lehigh Valley R. R., 1903	Scrapped in 1909
7	Schenectady	30988	1905	2-6-0	18x24	50"	110,000	American Loco. Co., 1905	Sold 1913
8	Brooks	38908	1907	2-6-0	18x24	50"	110,000	American Loco. Co., 1907	Sold 1920
9	Baldwin		1910	2-6-0	18x24	50"	110,000	Baldwin Loco. Works, 1911	Sold to Southern Iron & Equipment Co., 1918
10	Pittsburgh	2075	1897	2-8-0	20x26	50"	130,000	(E. H. Wilson & Co., 1913 (Note B	Sold to Southern I. & E. Co.
11	Brooks	3084	1898	2-8-0	20x26	55"	165,800	B. R. & P. Ry. Co., 1913	Scrapped
12	Porter	5775	1916	2-6-0	20x26	50"	147,200	H. K. Porter Co., 1916	In Service
14	Baldwin	14018	1894	4-6-0	19x24	55"	127,000	(Buffalo & Susquehanna R. R. 1917	Sold to Arcade & Attica R. R. in 1922
15	Schenectady	38178	1905	2-6-0	19x26	54"	145,000	(Note A	Scrapped
16	Porter	6455	1920 (Note C)	2-6-0	20x26	50"	147,000	H. K. Porter Co., 1920	In Service
17	Porter	6619	1921	2-6-0	20x26	50"	147,000	H. K. Porter Co., 1921	In Service
18	Porter	6762	1922	2-6-0	20x26	50"	147,000	H. K. Porter Co., 1922	In Service
19	Porter	6796	1923	2-6-0	20x26	50"	147,000	H. K. Porter Co., 1923	In Service

A—Ex Panama Railroad. Purchased from a dealer in second-hand railroad equipment who had rebuilt the engine, changing the gauge from 5 ft. to standard.
B—Ex Monongahela Railroad.
C—Rebuilt by the Porter Co., in 1936.
D—Ex D & H #37 "John B. Smith."

A Common Carrier of the South Before and During the War

By Charles G. Woodward

IN GEORGIA prior to 1830 the normal rate of increase in population had been retarded by the presence of Cherokees and Creeks. As the last of the Mobilians yielded to the pressure of an advancing civilization and were forced westward, the population by 1845 in many of the frontier counties showed a substantial increase in numbers.

Early there had been much commercial activity at Savannah. The first steamship to cross the Atlantic sailed from that port in 1819. Augusta, at the head of navigation on the Savannah River and western terminus in 1831 of the Charleston & Hamburg Railroad, was a growing center of distribution.

In the middle of the thirties from Savannah the Central Railroad and Banking Company of Georgia and from Augusta the Georgia Railroad and Banking Company began the construction of lines. The former was destined for Macon, the latter for Atlanta. Savannah and Macon were connected by rail before 1845. From Macon drawing a line southerly to the Gulf of Mexico and westward to the Chattahoochee River there lay a territory rich in its possibilities of originating tonnage without transportation facilities other than wagoning into Macon or to the river landings on the Flint and Chattahoochee. Shipping their outturn via the Apalachicola was circuitous, costly and slow.

The progressive management of any railroad is continually on the outlook to increase the volume of transportation units and maximize its productive capacity. Here conditions for expansion were favorable. Officers of the Central began in the month of October 1845 through the columns of local newspapers to create a sentiment friendly to the construction of a subsidiary line through this region. On the 25th of November 1845 a meeting was held at Fort Valley, Houston County. R. R. Cuyler, president of the Central, contended that the men of commerce in Macon and Savannah had at an expense of nearly $3,000,000. built the Central through a comparatively unproductive country, while that to be served by the South-Western was so fertile that after the first twenty miles were built it would pay and each additional mile would increase its net income further, that so thoroughly convinced was the management of the Central that he did not hesitate to say that the Central would contribute $250,000. toward the enterprise. The citizens of Macon had pledged $100,000. and now it remained for the planters who were most deeply interested in the result to make their subscriptions.

It was justly argued that the value of lands is vitally affected by transportation facilities on the basis that lands in the vicinity of cities would command twice to three times as much as those of equal quality but more remote from market. Appropriation of the unearned increment is alluring. The principle that a railway imparts to the no-rent land of Ricardo a definite value was as clearly recognized then as to-day.

As the planters saw their land values enhance, their crops yielding larger net returns, the friendly feeling toward the common carrier was naturally stimulated to greater activity. Ninety years ago the railway, owing to the small mileage, filled a large place in the imagination of the community likely to be benefitted. Wherever new lines extended, prosperity followed.

The South-Western was chartered in 1845 by the State of Georgia to construct a railway from Macon to Fort Gaines and Albany with right of eminent domain. It was capitalized at $2,000,000. Authority was vested in a Board of Six Commissioners. Books for stock subscription were opened in several counties at points designated in the charter on March 1st, 1846. Strange as it may seem, not a subscription was received for a single share. The chairman explained the failure on the theory that many considered the construction of a road through such a sparsely settled country as the scheme of visionaries entitled only to ridicule.

Blocked by lack of subscriptions, the Commissioners obtained a loan from the Central to enable them to survey the proposed line from Macon to Fort Gaines. When the survey was completed, many objections urged heretofore by the planters were removed, and a small number of shares were subscribed for. The management of the Central, recognizing the benefit derivable from an independent feeder, offered after a meeting of shareholders to take up to $250.000 whenever a like sum was underwritten by those living adjacent to the line.

At a meeting of the citizens of Savannah their aid was sought. Like the management of the railroad, they foresaw the economic uplift that would result commercially, and as President Alexander says in his report of December 7th, 1848, "Not willing to enjoy these benefits through the labor of others, without bearing a portion of the expense necessary to obtain them, with a spirit characteristic of themselves, ordered that a subscription of $250,000. should be made by their City Council to the stock of this Company, payable as soon as the completion of the road was placed beyond contingency." Subsequently, that the funds to be furnished by Savannah be immediately available, the city issued to the company $150.000. 7% bonds in lieu of its subscription, the proceeds being used to buy iron-rail for the line.

Charter requirements demanded that $500,000. capital should be subscribed for prior to incorporation. However, in fear that this amount would prove prohibitive, the Legislature on petition of the Commissioners December 30th, 1847 so amended the terms as to allow organization whenever subscriptions aggregated $200,000. On February 10th, 1848 the Commissioners convened the shareholders, and the Company was organized.

The Treasurer's Report of December 7th, 1848 shows $512,200. of capital stock as already subscribed for on the installment plan, $5. being the initial payment. Subsequent payments were to be at the rates of 5%, 10%, and 13%. Of the $76,948.28 received from subscriptions, $52,446.25 was in cash and $24,502.03 in I. O. U's.

The list of stockholders contains 454 names—all Georgians. The average holding per capita, inclusive of the Central, an owner of 2,500. shares, was 11.3 shares. With $52,446.25 as a nucleus in the Treasury after calls had been made for 33% payments, the work was begun of constructing a road destined to become a vital link in one of our trunk lines.

In 1846 the cost of shipping a bale of cotton from Columbus on the Chattahoochee or from Albany on the Flint via Apalachicola to New York with drayage, wharfages, etc. was $5.18. If a rail rate of 50 cents per 100 lbs. were promulgated between Columbus and Savannah, the cost of shipping a bale of cotton from Columbus, Georgia, to New York with greater expedition would be reduced to $3.97. The advantage, then, of the rail and water rate over the all-water rate was $1.21. Here lay the crux of the problem from an operator's viewpoint—to haul the cotton at 50 cents per 100 lbs. and draw it away from the river landings. The management placed an engineer in the field, and from his surveys the plan of capturing the tonnage was carefully thought out. The territory to be tapped forms roughly an equilateral triangle with the rivers on either side forming the boundaries. Projecting his line southwesterly, it was proposed ultimately to get the tonnage of Albany, further a line was run to Fort Gaines situated midway between Columbus and the confluence of the Flint and Chattahoochee Rivers. This latter line would traverse the richest cotton counties in southwestern Georgia, then but partially developed due to the costs of wagoning, to either river. The plan was comprehensive. It would give an impetus to the agricultural interests of that section and swell the Income Account of the Central Railroad and Banking Company of Georgia, and strike a blow at river navigation.

Chief Engineer Holcomb in his preliminary report of 1847 enunciates the principle now formulated into Woodlock's Law of Transportation—"That the supreme factor in the ton-mile cost is the train load." Recognition of this law was vital to the success or failure of the South-Western Railroad Company. To maximize the tractive effort of the motive-power, a line was projected from Macon to the first crossing of the Flint River, a distance of 48 miles with 68.8% tangent. The maximum curvature was 2° 16″, and the maximum gradient was 45′ per mile—conditions unusually favorable for efficient operation.

The motive-power of the forties ran on a track so different from that of to-day that it merits description. It was built with cross-ties 8′ long, 8″ square, set 4′ apart, bearing stringers 20′ 6″ long, 8″ square tree-nailed to the ties supporting a flange rail of iron, length 18′ weighing 34 lbs. to the yard. In the south the grades, the lines lying largely in the coastal plain, were less severe than in the hilly areas of the north; consequently the cost of cuts and fills was less, and to carry the motive-power of less weight yet of equal or relatively superior tractive effort due to the easy gradients admitted a track of inferior construction yet not infrequently of greater productivity than in the north.

The road was opened for regular traffic the 1st of August, 1851, from Macon to Oglethorpe, 50.5 miles. The stock-ledger of 1852 showed

that of a total capital aggregating $556,300., 77.1% was held in Savannah, 9.1% by contractors, 1.4% by non-residents of Georgia, and only 12.4% by the people of Macon and the points affected by its construction. In his report of February 12th, 1852 the president writes, "$68,800. is the amount of stock owned in southwestern Georgia, and to this may be added the sum of $30,283. paid on forfeited shares, and we have the sum of $99,083. as the amount contributed by planters to a work that has cost over $700,000., the principal benefit of which is enjoyed by themselves." The planters, in a word, forfeited $32,283. or 32.5% of their original subscription. Embarrassed by their failure to put up capital and meet maturing installments upon their stock, the management in 1851 was forced to issue for completion of the road $100,000. 7% Non-Convertible 10 and 11 Year Bonds guaranteed by the Central Railroad and Banking Company of Georgia. In 1852 dividends were begun at the rate of 8%. The road now in operation concretely demonstrated its value to the planters. Quick and cheap transportation supplanted the slow and expensive wagoning.

The management was now urged to extend its lines toward Americus and again to the westward. Financing was a big problem. To supply this section with facilities, the management made a conditional proposal that if the citizens of Americus and vicinity would subscribe $75,000., the South-Western would agree to raise $125,000. The conditions were fulfilled and the extension completed.

On May 16th, 1853, the branch from Fort Valley westward to Butler was opened where connection was to be made when the Muscogee Railroad, which was in process of construction eastward from Columbus, was put in full operation. By August 10th, 1854, to complete these branches had swollen the Funded Debt to $400,000. 7% Bonds, and the capital stock aggregated $935,200. As a regular 8% semi-speculative investment, the stock obtained a broader market.

In 1856 a group of promoters ostensibly began the construction of a line from Americus to Albany 36 miles in length under a charter granted the Georgia & Florida Railroad Company. Grading progressed, and the management of the South-Western after some negotiations purchased and completed the line at a cost of $442,328. payable in its own stock.

In 1855 and '56 the Company showed surpluses after the 8% dividend and full maintenance. Tariffs were promulgated not on the basis of the cost of service or potential competition, but on the value of service principle. "Charging what the traffic would bear" meant that rates just low enough to prevent the River Navigation lines from getting the tonnage would be enforced. These were profitable. Passengers were charged four cents per mile. This rate and a schedule of thirteen miles per hour indicate that the Company lost nothing from this branch of the service provided an adequate volume of traffic could be secured. Eighty years ago the superintendent, burdened with the duties of assembling the force, moving the traffic, and responsible for purchases, normally had little use for statistics and no time to prepare them. This method of disciplining a property was, broadly speaking, little used. To maintain the property and earn dividends were the objects sought then as now

of the management. However, to-day the operator tries to surpass his prior record for efficiency. He struggles to hold his net profit per unit against increasing costs or declining rates. The simple condition of the middle fifties arose from the lack of competition of markets. Virgil Powers, engineer and superintendent of the South-Western Railroad, was a man of conspicuous ability and tireless energy, and he deserves great credit for the relatively elaborate statistics that he prepared to measure his locomotive performance, etc.

Strengthened financially from a growing faith in the earning capacity of the property by the investors of Georgia, in October 1856 the management held a meeting to determine the feasibility of extending the line through to the Chattahoochee. Although the Company was well beyond the period of suffering from the failure of subscribers for stock to meet their commitments as they matured, yet the management proposed to secure the substantial cooperation of the territory to be served. And on its part the Company agreed to built 85.8 miles of road, provided the people located in the several counties along the proposed line would subscribe for $600,000. capital stock. The subscriptions aggregated $633,300., and the work was undertaken.

To further advance its interests and protect its traffic volume, the railroad became a holding company in 1858 buying $5,000. capital stock of the Propeller Steamship Company operating between New York and Savannah. To monopolize the tonnage originating beyond the Chattahoochee in Alabama the Company acquired an interest in the Mobile & Girard Railroad Company destined to tap the rich cotton belt of that state, and also in the Montgomery & West Point Railroad, etc. On September 10th, 1860, the line to Fort Gaines was completed, and on October 23rd, 1860, the extension to within one mile of Eufaula was finished; 206½ miles of main line and fourteen miles of sidings were now in operation, representing fifteen years of work.

The Company, capitalized at $3,566,400. in 1861, owned 22 locomotives standing on the books at $110,660.14 or $5,030. each, representing conservative valuations due to charging purchase of equipment to operating expenses, 30 passenger train cars at $24,000. or $800. each, and 208 freight train cars at $100,000. or $480. each. The stockholders numbered 845 in 1861 as contrasted with 455 in 1848; meanwhile the average holding had increased from 11.2 shares to 36.1 shares. The original subscribers were the descendants of the English and Scotch-Irish. In 1861 as a demonstrated profit producer the names of many other than those of British origin are not infrequently found in the list of shareholders, as well as a goodly scattering presumably descendants of French and Swiss Huguenots, as these names under the letter G may indicate—Gallie, Gaudry, Germain, Gallaudet, Guerard, and Guillam.

As in the progressive development of the West, so in southwestern Georgia the cost of constructing the railway, a creator of increased values, was only slightly borne by the landowners, the chief beneficiaries. The outside capitalist raised the funds from which others reaped the reward. In 1860 a proposal to water the stock was considered and promptly rejected. The capital then totalled $2,921,900. By forfeitures

on subscriptions and undistributed earnings $380,627.90 had been added to the property not capitalized. Reports of the several officers in 1860 show they had raised the property to such a state of efficiency that operation could be conducted at a low cost, thus fortifying it against threatened hard times.

R. R. Cuyler, president of the Central Railroad and Banking Company of Georgia and the South-Western Railroad Company, had for many years been a leader in Georgia and possibly the ablest railroad manager south of the Potomac. He knew the military spirit of the men, their enjoyment of war literature, their skill as marksmen, their horsemanship, and their feeling that to do battle was the highest glory of man. Conscious of these ideals, he dwelt in his report of August 8th, 1861, upon their confidence in arms at the beginning of the struggle, the immediate curtailing effect of the blockade on revenues, the willingness of the officers to submit to reductions of salaries, and their eager cooperation to maintain "States Rights" and the "Institution of Slavery."

Mr. Cuyler writes, "The Board has deemed it prudent, in view of the probability of very short earnings in the immediate future, to retain in hand the surplus of earnings shown above to exist, after the declaration of a dividend of 3% for the last six months. This is the first dividend day on which there has been a failure to declare 4% semi-annual dividend. An examination will show that the earnings of the road have fallen off largely and suddenly. It now requires strict attention to keep the expenditures within the gross revenue. Great reduction has been recently made in the expenditures and to-day all the salaries of the officers have been reduced from 40% (on the president's salary) down to 8%.

"The existing blockade has cut off entirely the transportation of goods, one of the main sources, hitherto, of our profits. It is the policy of our Government, as long as the blockade continues, to discourage the movement of cotton to the sea-ports. For some time, we shall make nothing by the carriage of the present cotton crop. The planters generally will make abundance of grain, and we shall have but little more of breadstuffs to carry. We cannot reasonably hope for a revival of business before the end of the year. By that time the necessities of the European world, the success of our arms and the greatly increased burthens upon the people of the United States will, it is believed, produce a great change for the better in our condition. In the meantime, our stockholders will suffer in common with the rest of the people, but they will bear patiently burthens necessarily imposed upon them as the price of establishing our independence. Considering the malignant hatred of the North toward the South, their mortification at defeat on the field of battle, and their well-grounded fear that their section will be overshadowed by the Southern Confederacy, peace is not to be expected at an early period. The determination of the North to pursue and subjugate the South will continue until sufficient time shall have elapsed to convince the world that the South cannot be conquered. That we shall carry this conviction to the North—no matter what may be the cost of blood and treasure—cannot be doubted for a moment.

"But although the blessings of peace and amity with all nations may be postponed, we believe that the Government of the United States will be compelled to abandon the blockade before the first day of January next. That Government will find it more difficult to carry on their war of invasion, than the Confederate States will find it to maintain their position, and when their people shall see, as they surely will, notwithstanding their present blindness, that the vast appropriations of money and insatiable calls for 'grand armies' of men, by their despotic rulers, are likely to impose upon them and their children, for generations to come,

an immense public debt and consequent heavy taxation, the small voice which has already been heard in their Congress for peace will swell into a loud demand that the Confederate States shall be acknowledged to be a free, sovereign and independent nation.

"All the Banks, all the Railroad Companies, all the men, all the women, and even the children, within the Confederate States, (save the disgraced few in Western Virginia and Eastern Tennessee,) have already given, and daily give, the most indubitable proofs of firm resolve to support and aid our Government with their money and their lives. To such a host, putting their shoulders to the wheel, and humbly supplicating the Almighty Ruler of events for help, there never can come disgrace or defeat."

Strong was the confidence of President Cuyler during the early days of the struggle in the success of their arms. At that time he could not envisage the effects of ultimate isolation or mechanical limitations in an essentially agricultural region. Doubtless then it was believed that the South-Western Railroad was in such excellent physical condition that it could be operated for some years without marked impairment. The experience of the Company is instructive.

During the years 1862, '63 and '64 respectively, 17, 18 and 54 miles of ties were renewed and 19, 22 and 33 miles of stringers, but fractions of the normal requirement. Under orders of General Beauregard in 1864 the rail on the Fort Gaines division was torn up and divided between the Central Railroad and Banking Company of Georgia, the Macon & Western R. R. Co., and the Atlanta & West Point Railroad Company to keep the main lines of traffic open. Leaving out of consideration this branch dismantled by the military authorities, the management at the end of four years operated the road under slow schedules without derailment.

Reporting on the condition of the property in August 1866 the Superintendent writes, "Our Iron is badly worn. The timber in the track and bridges is decayed and requires heavy outlay for repairs."

What were the effects of blockade on equipment? The inventory of 1861 showed 22 locomotives, all built at the North,—17 or 77.2% were in good order. Virgil Powers, Superintendent, reported August 1, 1863, "By reference to the table of locomotives it will be seen that 6 engines are now in want of tire and 4 others will need them. They are all now running on the road but any of the 10 are liable to fail at any time. The engines, otherwise, are in very good order, and if we could get a supply of tire, could be kept in good running order for a number of years."

In 1865 the number of locomotives in good order had dwindled to 8 or 36.3%. A cord of wood in 1861 produced 84½ engine-miles; in 1864 the number had decreased to 59½ or 29.7%. It is easy to visualize a medium size wood-burning locomotive with balloon stack, belching forth the yellowish gray smoke from the pine knots, with a fog-bank of steam from leaky packings enveloping the boiler. This and other factors, such as worn parts, inadequately cleaned boilers, inferior quality of fuel, etc., might easily reduce the efficiency of the motive power.

At the close of the war in 1865, 12 of the 13 first-class coaches and 10 or all of the second-class coaches needed repairs and paint; and of 7 baggage, mail and express cars, only one needed repairs and paint. In 1861 the Company owned 192 box and platform freight cars; in 1865, 143, a loss of 49 or 25.5% in four years. Such demoralization prevailed that to trace all of the cars routed under military authority was impossible. However, it was known that in a cotton train, seven were burned at Wilmington, North Carolina, eight when General Hood evacuated Atlanta, ten were sold to the Confederate Government for coal cars, and eight platform cars were broken up to release their wheels and trucks to repair box cars.

What proved to be the great problem in construction of the South-Western Railroad Company during the War was to build the bridge across the Chattahoochee River and carry the rails into Eufaula, Alabama, then an outstanding primary cotton point. This caused prolonged difficulties. In his report of August 7th, 1860, Virgil Powers writes, "The contract for bridging, masonry and grading west of the river was let on the 13th day of March to A. E. Thompson, Esquire, to be completed on the 1st of January next" (1861). To obtain stone of suitable quality and other material for piers in 1861 was baffling. In 1862 persistent high water arrested progress. As of August 1, 1863 Mr. Powers writes, "The stone and brick work for the bridge across the Chattahoochee River at Eufaula is completed and the wooden superstructure being framed. With a favorable Fall, there is no doubt the bridge will be finished and the road completed into Eufaula this year." On August 12th, 1864, President R. R. Cuyler reported, "The contractor for building the bridge over the Chattahoochee having failed to comply with his contract, it became necessary for the Board to make immediate provision for the completion of the structure. Hence the appropriation of $75,000. for this purpose. The people of Eufaula had claims on this point, which there was no disposition on the part of the Board to disregard." As of August 1, 1865, Virgil Powers writes, "The bridge across the Chattahoochee at Eufaula has been so far completed that our trains now run to the depot in the city. This is an important bridge, and it will be necessary for its preservation to have it weatherboarded and covered immediately, as it will be injured by exposure to the weather."

Limited by the exigencies of war, nearly five years were consumed in the erection of the bridge over the Chattahoochee River into Eufaula.

One of the most obscure points in regard to the early management of railways in the south is that of slave labor. There slavery, that survival of the dawn of civilization, and the modern railway corporation were coexistent. What was their relation? Dim is the light let in upon this subject. Certain references were made from year to year showing that none but the slave-gangs of contractors under white overseers built the road-bed and track. In the Superintendent's report of 1856 there appears this item under the caption *Repairs of the Road*, "is included $1,150. paid for negro who died from ill treatment of an Overseer." In 1857 under the same caption "is charged $1,248. paid for negro killed by ditching train," and again in 1857 under caption *Incidental expenses* "is included $715.83 judgment obtained for negro who died on the Road in June 1854."

In his report of August 15th, 1863, President Cuyler makes the first and only reference to this question as follows: "From the Balance Sheet it appears that the cost of road and outfit, including several negroes, purchased for it stands this day at the sum of $3,538,211.94." Among the disbursements is the item in capital account "Negroes for Road $9,450." By the Balance Sheet of August 1, 1864 the capital cost had been increased to wit: assignable to "Land and Negroes $81,185." The item reappeared on July 1, 1865, and as at August 1, 1866, the item "Land and Negroes" was $83,185., the same in 1867, and was continued

as a bookkeeping asset until August 1, 1868, when apparently the item $75,250. for Negroes was written off, leaving Land at $7,935., closing a chapter in the history of one American railway.

In the struggle between the detachments of the contending armies to control the common carriers throughout the south, probably no territory suffered less from interference in operation by the Army of the North than this section of Georgia. The only deliberate destruction of property was the bridge over the Flint River on the Columbus branch, burned on April 19th, 1865 by the military authorities of the Confederate States. General Sherman destroyed the track of the Central Railroad and Banking Company of Georgia, an offensive move, an end in itself. The only other areas where the Confederate Army practically maintained its hold on the railways were between Richmond, Virginia, and Wilmington, North Carolina; between Richmond, Virginia, and Danville, Virginia; and until late in the war the section between Petersburg, Virginia, and Norfolk, Virginia, on the Southside Railroad. From Richmond as a centre, the transportation lines radiated connecting with the east and west railways of Georgia and South Carolina. These fed the Wilmington & Weldon, now the Atlantic Coast Line, with tonnage destined for the Front. Built to transport cotton, the Southwestern Railroad now faced a blockade against its specialized tonnage.

Could the planters adapt themselves to the changed conditions? This question the statistics prepared by the superintendent partially answer. Although from August 1st, 1864 till August 1st, 1865, the year after, the conscription was issued so broad in its terms as to enforce military duty on all able to bear arms, not even excluding enough to keep up the commodity classifications, yet the figures as prepared up to and including seven months' operation in 1864 shed not a little light upon the way the planters met the situation. Over the lines of the South-Western in 1860 were moved 206,307 bales of cotton; in 1864, 18,575 bales were carried, a decrease in the natural supporting commodity of no less than 91.1%. In 1860 the planters shipped over the line 2,238,937 lbs. of bacon; during the year ended August 1, 1864, the total rose to 5,050,448 lbs., an increase of 125%. An examination of the corn statistics indicates an almost progressivve increase from 19,376 bushels in 1860 to 1,752,581 in 1864, or 8,945.11%.

This section, so well adapted to the culture of cotton, was turned from a cotton into a corn belt; the amount of corn as shipped out in five years increased 1,733,205 bushels. This, however, fails to represent the entire outturn of corn, no small fraction of which was fed to hogs and outshipped as bacon. Again it fails to represent that raised, wagoned to and consumed at the Andersonville Stockade. Briefly, the region traversed by the South-Western became a granary of the Confederacy. To quote the words of President Cuyler of August 15th, 1863, "Our revenue has been derived chiefly from the carriage of grain and of passengers." The Stockade at Andersonville was peculiarly well located from an economic viewpoint then, the prisoners were at a maximum distance from their commands by land northward, and escape southerly via Pensacola necessitated the dangers of crossing through swamps and swimming

rivers; further, to support them there at the base of supplies entailed the least effort. The increasing number of captives rushed over the sixty miles of road from Macon to Andersonville toward the close of the war shows well the activity of the Confederacy in placing the prisoners where chances of escape were small.

In 1860 the average number of passengers carried per day aggregated 353; the total declined in 1861 to 322, and again in 1862 to 310. In 1862 Superintendent Virgil Powers writes, "Of this number, at least two-thirds were soldiers who were carried at two cents per mile, one-half of the regular fare." The average of 1862 was the minimum figure; in 1863 the number jumped to 489; in 1864 the total per diem of 1863 was more than double, reaching 996; while in 1865 the average expanded to 1,162, or a figure well in excess of thrice the total carried in 1860, largely due to the presence of the Andersonville Stockade. These statistics well sustain the assertion of the president respecting income assignable to Passenger Traffic. The fare per captive from Macon to Andersonville was $1.20, and during the last year of the war at least 700 per day were moved, producing $840. revenue. After 1862 no mention is made of the special rate granted the soldiers, and it is not improbable that a new rate was put in force as the purchasing power of Confederate money decreased; hence, it may be that the revenue assignable to prisoners was well in excess of $840. per day during 1864 and '65.

Located happily beyond the battle lines, the management of the South-Western Railroad Company operated a quasi-self-contained unit. Broadly speaking, neither iron rail nor equipment could be purchased. Two sawmills were acquired and operated by the Company, and their output was insufficient to meet the necessities of the road. Lubricants, such as oil and tallow and illuminating oil for the headlights, reflected the rise in prices from currency depreciation and scarcity. In justice to Secretary of the Treasury Charles G. Memminger of the Confederate States, it must be admitted that he strove mightily to control the issue of fiat money and stabilize prices. Unfortunately his efforts met with scant reward. Prior to January, 1862, the *"Richmond Enquirer"* reported that runners were traversing the country buying up specie at 30%, 40% and 50% premium. Early speculation in the premium indicated the trend, although during 1861 the Confederate States exchanged their own notes for bills on England at par, with which they paid for all their arms and munitions of war. However, with the lapse of time and the insistent demand for funds, the issue of currency expanded. The maximum volume of Confederate notes will doubtless remain a mystery. The attendant evils of progressive redundancy of uncovered notes may be roughly measured by the scale of depreciation adopted by the Legislature of North Carolina, which scheduled the variations in value of one gold dollar in its equivalent of Confederate currency covering the several intervals by months; in 1861 the rate was from $1.00 to $1.15, in 1862 from $1.10 to $2.50, in 1863 from $3. to $20., in 1864 from $21. to $49., and in April 1865 it was $100. or one cent on the dollar, according to Horace White "Money and Banking."

The following table of Locomotive Performance and Costs reflects the rising prices of fuel, maintenance, and particularly oil, tallow and waste per mile run, as inflation progressed:

LOCOMOTIVE PERFORMANCE AND COSTS EXCLUSIVE OF GRAVEL AND SWITCHING ENGINES

	Miles Run	Miles Made				Cost Per Mile		
		Per Gal. Oil	Per Lb. Tallow	Per Lb. Waste	Per Cord Wood	Maintenance	Wood	Oil Tallow Waste, etc.
July 31, 1860	307,050	188⅞	29½	50½	94¾	4.6c	2.5c	2c
July 31, 1861	330,245	171	28¼	54	84½	3.9	2.8	1.1
July 31, 1862	221,668	141½	24½	49	82½	5.6	2.9	2.8
July 31, 1863	278,815	172	19	71½	67 7/10	11.8	4.1	7.9
July 31, 1864	331,179	168	17	87½	59½	37.2	11.8	25.4
July 31, 1865	—	—	—	—	—	—	—	—
July 31, 1866	—	—	—	—	—	—	—	—
July 31, 1867	306,335	137	30	72½	61	15.6	5.3	2.5

THE MINIMUM AND MAXIMUM OPERATING COSTS OF LOCOMOTIVES PER MILE, 1861-1864

Locomotive	Class	Year	Miles Run	Miles per Cord of Wood	Fuel Cost per Mile
T. M. Furlow	Pass.	1861	28,485	124	1.8c
Ocmulgee	Comb.	1864	16,572	44	15.9

The first effects of the war with an unsettlement of business meant diminished earning capacity, and comparing 1862 with 1860 it is found that the gross earnings fell from $676,895.87 to $368,336.74, or $308,559.13 or 45.7%; meanwhile net earnings shrunk from $385,012.29 to $128,232.69, or $256,779.60 or 66.9%. In 1863 the earnings measured in the depreciated notes of the Confederacy expanded to $835,062.44, in 1864 to $2,361,724.68, and in 1865 to $3,153,674.48, an increase over 1862 of 754.8%. Maintenance of dividends upon any stable basis of rate was an impossibility. They vary as follows; in 1860, 8% regular and 5% extra; in 1861 7%; in 1862 4%; in 1863 12%; in 1864 20%; in 1865 dividends were suspended after making adjustment for $1,703,893.65, due to the South-Western Railroad Company by the Confederate Government written off. This loss, $1,703,893.65, was especially burdensome, as the Congress of the Confederate Government had enacted in 1863 an income tax, as follows, to quote the words of President Cuyler, "The tax act declares that whenever a corporation does not set apart, for the Government, 10% of the amount declared for dividends and carried to reserve funds, the stockholders shall pay an income tax of 10% on the amount of their dividends. Thus, in one form or the other, the Government is to receive the tax. The Government will be benefited greatly by the Company's paying the tax, and the stockholders cannot be injured by that course. Considering the trouble of collecting from the stockholders, the fact that some of them may be alien friends, and thus escape taxation, and also, considerable loss might happen in gathering the tax from so

large a class of persons, the Board thinks it best, whilst it protests against the authority of Congress to impose the tax, to pay it promptly. By this course, the Board gives evidence to the General Government, of a continued desire to do all in its power to maintain the cause of our country, (although) by the charter of the Company it is provided that no higher tax shall be paid than one-half of 1% on the annual income."

Throughout the period from August 1861 to July 31st, 1865 the finances of the South-Western Railroad Company were handled with conservatism under the guidance of John T. Boifeuillet, Treasurer, the capital stock increasing from $3,176,400 to $3,198,400, or $22,000. The funded debt increased from $390,000 to $441,000. 7% Bonds, or $51,000; working assets from $148,519 to $229,809, or $81,290; and quick liabilities from $5,936 to $122,049, or $116,113. On July 31st, 1865 the Company had a comfortable working balance of $107,760.

The following extract from President Holt's report of August 9th, 1865 exhibits the position taken by the partner and thoughtful creditor during a period of extreme inflation, "There is due on dividends Nos. 23 and 24, $71,584., which amount has not been called for by the shareholders. Both of the dividends are payable in Confederate Treasury notes, which accounts for the tardiness on the part of the stockholders in calling for them. * * * The bonds outstanding amount to $441,000. Of this amount there fell due in 1862, 1863, 1864 and 1865 $60,500. These bonds were not presented as they respectively fell due, but recently a portion has been presented for payment. Owing to the deranged state of the Currency, and other difficulties which we have to encounter, the Board finds itself unable at the present time to meet the demands made upon it as they were wont to do; but believe in a short time that, by negotiating a loan of $100,000., it will be able to pay both principal and interest, as the latter may accrue."

Striking is this statement. In 1860 the value of the South-Western was more than $3,500,000. as capitalized upon a 10% basis. The financial resources of the South had been exhausted by the long drawn struggle, but more burdesome was the loss entailed by the manumission of the slaves. The virtual disfranchisement of the whites and enfranchisement of the blacks, coupled with distrust of the financial future, acted as a barrier against the inflow of capital. This inability of the Company to borrow except at usurious rates added much to the difficulties of "Restoration," and is an excellent illustration of a principle not generally recognized, that until within a decade a railway permitted to charge reasonable rates, with dividends suspended or reduced, in a growing region would soon become financially strong.

In 1865-1866 the management promulgated a new tariff with rates averaging 50% higher than in 1860 to compensate for prices of materials that had in some instances advanced 200%. This increase, with a resumption of traffic, produced net earnings of $343,801.47 in 1866. With this sum the Company bought 47 freight cars for $36,598*; $40,804.20

*"This purchase was made from the United States Government at Nashville, and became necessary as our old rolling stock was not only much reduced in quantity, but its usefulness much impaired for want of proper materials to keep it in running order."—President W. S. Holt.

was expended for new construction; a Revenue Tax of 2½% on the gross earnings, or $26,934.85, was levied by the United States Government; and a dividend of 4% was declared amounting to $127,936., etc., leaving a credit to Profit and Loss of $31,705.08. To maintain the road after the war was costly—iron rails per ton in the fifties ranged from $37.50 to $50.00, while in 1866 the price advanced to $96.02. Locomotives before the war cost $9,500; after it, $15,000. During 1867, although the policy was pursued of purchasing equipment out of earnings, yet the Company paid 9% dividends.

To increase the production of cotton, the management encouraged the use of phosphates in 1867 by making a nominal rate sufficient to cover the cost of service. This involved a new principle, diametrically opposed to "charging what the traffic will bear."

In the autumn of 1867 the South-Western faced rail and water competition, for some years afterward the terror of the Trunk Line managers. The Atlantic & Gulf Railroad was opened between Savannah and Bainbridge, Georgia, on the Flint River. This Company formed an Association with the Barnett Line of Steamers plying on the Chattahooche and Flint Rivers, and the combination cut rates 25% below the tariff of the South-Western on traffic originating at or destined to Fort Gaines, Eufaula, etc. Its management regarded the traffic originating at these points as belonging to it regularly and legitimately and did not yield without a struggle enforcing a flat competitive rate. Now the dictum of George Stephenson, inventor of the Rocket, came into play, namely, that "where combination is possible, competition is impossible." And on January 20th, 1868, a "Gentlemen's Agreement" was formed between the competing lines. It was stipulated in the Agreement that upon thirty days notice by either party, the contract might be annulled. The Atlantic & Gulf Railroad in February, 1868, gave notice that the South-Western might consider the contract abrogated, and the South-Western protected itself by purchasing on joint account with the Central two river steamers. The Company had now passed through all conditions of rate-making, involving, first, "Charging what the traffic will bear," second, "Cost of Service," and third, "Competition."

Broadly speaking, without an infusion of new capital, rehabilitated and improved from earnings, regular 8% dividends were resumed upon the shares in 1868 and 1869. In the latter year, the Muscogee Railroad, extending from Butler to Columbus, Georgia, 49.43 miles, capitalized with $313,500. (7%) bonds and $773,550. stock, was merged into the South-Western in conformity with an Act of the Legislature passed in 1856. The basis of exchange was $100. stock of the Muscogee for $87.50 stock of South-Western. This augmented the capital account by $998,-500. to $3,939,900.

Through the absorption the South-Western Railroad Company acquired from the Muscogee Railroad 49.43 miles of the following type of track:

41 miles	4067′	32	lb. per yd.	Iron Flange	Length 18′-21′
3 miles	165′	40½	lb. per yd.	"T" Iron Rail	Length 21′-24′
	430′	41	lb. per yd.	"T" Iron Rail	Length 18′
2 miles	3519′	43	lb. per yd.	"T" Iron Rail	Length 24′
	2150′	48	lb. per yd.	"T" Iron Rail	Length 24′
1 mile	2500′	56	lb. per yd.	"T" Iron Rail	Length 20′
49 miles	2271′				

To put it briefly, of the 49.43 miles of the track of the Muscogee Railroad Company, no less than 81.8% was built with Flange Rail.

Virgil Powers on August 1, 1869, reported, "We received from the Muscogee Railroad eight locomotives, one of which, the Savannah, has been sold to the Macon and Brunswick Railroad Company for $4,500. and another, the John H. Howard, condemned." The John H. Howard was built by M. W. Baldwin & Company and placed in service in 1851. The list of other locomotives taken over and continued in service by the South-Western Railroad was as follows:

Name	Builder	When Acquired	Type of Service
R. A. Ware	M. W. Baldwin & Co.	July—1851	Under Repair
Chattahoochee	R. A. Anderson & Co.	May—1853	Passenger
Columbus	Rogers, Ketchum & Grosvenor	Nov.—1854	Passenger
Atlantic	Rogers, Ketchum & Grosvenor	Nov.—1855	Freight
Pacific	Rogers, Ketchum & Grosvenor	Nov.—1855	Freight
John L. Mustain	Baldwin Locomotive Works	June—1860	Passenger

From the Muscogee Railroad Company, the South-Western Railroad Company received 7 passenger train cars, 2 cabooses, and 59 Freight train cars. "And decreased by the sale of two passenger cars to the through passenger line between Augusta and Montgomery, in which this Company owns one-fifth interest, in the eight passenger cars now in that line."

A view of the physical property of the South-Western Railroad Company in 1869 would have shown that it consisted of 257.5 miles of main line composed of 64.82 miles, or nearly 25%, laid with iron flange rail rolled in 1851 and 1853, weighing 32-34 lbs. per yard, length 18′-21′, in use 16 to 18 years; and 192.68 miles laid with iron "T" rail, largely English rolled between 1853 and 1869, weighing 40½-41-42-43-45-51 and 56 lbs. per yard, varying in length from 19½ to 28 feet. The Inventory included the following units of equipment: 32 Locomotives—35 Passenger Train Cars—11 Cabooses—and 374 Freight Train Cars.

On the 24th of June, 1869, the Central Railroad and Banking Company of Georgia leased the South-Western on a dividend-sharing ratio 10% to 8% basis, 7% being the guaranteed minimum. As an operating company its individuality ceased. It became the integrating link in a trunk line, and to-day has the distinction of being among the longest railroads in the United States, 332 miles, without encumbrance of debt.

Year	Locomotives	Builders		Charged to Construction	Charged to Expense
1851	Tobesofkee	Rogers, Ketchum & Grosvenor		"x"	
1851	Echeconnee	Rogers, Ketchum & Grosvenor		"y"	
1852	Tallahasse	Rogers, Ketchum & Grosvenor		"z"	
1853	Eufaula	Rogers, Ketchum & Grosvenor		"x"	
1850	George Hall	Rogers, Ketchum & Grosvenor		"y"	
1853	Post Boy	Seth Wilmarth		"z"	
1853	Savannah	M. W. Baldwin	1853	"x"	
				$36,472.99	
1853	Seminole	Rogers, Ketchum & Grosvenor	1854	17,396.55	
1853	Muscogee	Rogers, Ketchum & Grosvenor	1854		
1854	Cherokee	Rogers, Ketchum & Grosvenor	1855		
1854	Choctaw	Rogers, Ketchum & Grosvenor	1855	27,655.12	
1854	Chickasaw	Rogers, Ketchum & Grosvenor	1855		
1856	L. O. Reynolds	Rogers, Ketchum & Grosvenor	1856	11,214.60	
1856	Muckalee	Rogers Locomotive Works	1857	9,650.00	
1857	Kinchafoonee	Rogers Locomotive Works	1858	19,500.00	
1857	Thronateeska	Rogers Locomotive Works	1858		
1859	Emerson Foote	Rogers Locomotive Works	1859		
1859	Ocmulgee	M. W. Baldwin & Co.	1859	20,743.00	
1859	Andrew Low*	Rogers, Ketchum & Grosvenor	1859		
1860	Pataula	Rogers Locomotive Works	1860		
1860	John McNab	M. W. Baldwin & Co.	1860	15,000.00	$12,500.00
1860	G. W. Adams	M. W. Baldwin & Co.	1860		
1861	T. M. Furlow	M. W. Baldwin & Co.	1861		
1861	Chipola	Rogers Locomotive Works	1861		28,500.00
1861	Pachitla	Rogers Locomotive Works	1861		
1862	* * *	* * * *			
1863	* * *	* * * *			
1864	* * *	* * * *		—	—
1865	* * *	* * * *		—	—
1866	* * *	* * * *		—	—
1867	R. R. Cuyler	Rogers Locomotive Works	1867		$30,000.00
1867	W. A. Black	Rogers Locomotive Works			
1867	John W. Anderson	Baldwin Locomotive Works	1868		29,091.00
1867	W. S. Holt	Baldwin Locomotive Works			

Under act of Senate and House of Representatives of the State of Georgia in General Assembly met and approved December 27th, 1845, the following were named as Corporators of the South-Western Railroad Company: "J. Cowles, E. Alexander, Chas. Day, James Dean, Thaddeus G. Holt, W. B. Parker, A. R. McLaughlin, Charles Cotton, James Rea, Erastus Graves, J. L. Jones, Charles Campbell, Edwin Graves, E. A. Nisbet, H. G. Lamar, J. D. Carhart, J. B. Ross, T. A. Brown, R. H. Randolph, N. C. Monroe, and such other corporation and Individuals as may be associated with them and their assigns."

On the 10th of February, 1848, the stockholders met, the Commissioners held an election, and in accordance with the terms of the charter, the Company was organized, and Elam Alexander was elected president.

The following list records the officers from 1847 to 1869 and shows the list of directors beginning in 1851, when first set forth, until 1869:

---

*In 1859 the South-Western Railroad Company paid $1500 for the "Andrew Low," to be used on a gravel train. It was old, worn out, and appeared but once on the Roster.

COMMISSIONERS

Named under Charter, December 27, 1845

Elam Alexander, Chairman
T. G. Holt
James Dean
Briggs H. Moultrie
Charles Day
J. Cowles

OFFICERS

Presidents

Elected		*Retired*
1848	Elam Alexander	1850
1850	L. O. Reynolds	1855
1855	R. R. Cuyler	1865
1865	William S. Holt	

Engineer and Superintendent

1847	F. P. Holcomb, Engineer	1852
1853	George W. Adams, Supt.	1858
1853	Virgil Powers, Engineer	
1858	Virgil Powers, Engineer and Supt.	

Secretary and Treasurer

1848	Henry L. Jewett	1849
1850	William S. Holt	1851
1852	John T. Boifeuillet	

DIRECTORS

Elected		*Retired*
1851	R. R. Cuyler	1865
1851	John W. Anderson	1867
1851	A. H. Chappell	Prior to 1855
1851	David Kiddo	1852
1851	William A. Black	1868
1852	William S. Holt	
1855	T. M. Furlow	
1856	Robert A. Smith	1863
1863	John McNab	
1863	D. A. Vason	1866
1863	John E. Jones	
1865	Thaddeus G. Holt	1866
1866	Virgil Powers	
1866	William M. Wadley	
1867	Alex. R. Lawton	
1868	Howell Cobb	1869
1869	Jno. L. Mustian	

Locomotives of the New Haven R. R.

By Chas. E. Fisher

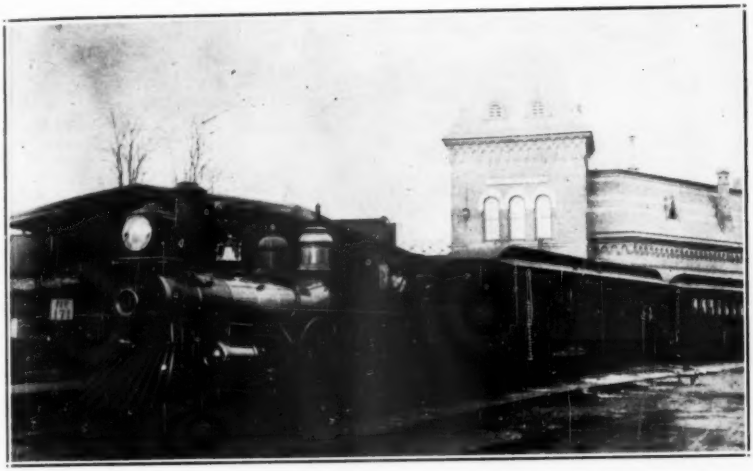
WE turn now to the most interesting railroad in the State of Connecticut, the

HOUSATONIC RAILROAD

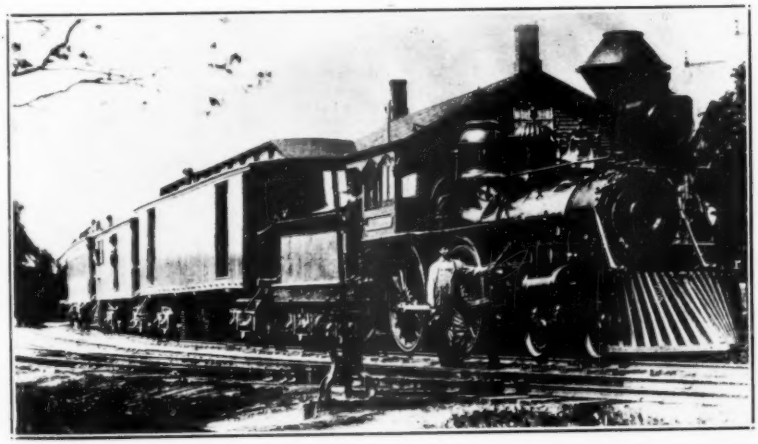
This railroad, incorporated in the State of Connecticut in 1836, erroneously as the *Ousatonic* Railroad Company, was a north and south line running from Bridgeport to Brookfield and then followed the valley of the Housatonic River to Sheffield and on to the northern State line near Canaan. The road was opened from Bridgeport to Brookfield, Jct., Feb. 11, 1840 and to Canaan in 1842. The Berkshire R. R., connecting Canaan with Van Deusenville was opened and leased to the Housatonic in 1842, so that by December 1st of that year, the Housatonic R. R. was in operation from Bridgeport to West Stockbridge, Mass. At the latter point, connection was made with the Albany & West Stockbridge and the Western (Mass.) R. R. for Albany. The line to Pittsfield was not opened until December 29, 1849.

The charter granted by the State of Connecticut authorized the road to build in a northerly direction towards the Massachusetts-Connecticut Line from Bridgeport or in a westerly direction towards New York City. Feeling that competition with the steamships on Long Island Sound was hopeless, the road chose to build north and thus tap the traffic from the Middle West. Had they chosen to build towards New York City, it is doubtful if the New York & New Haven, parent of the present New Haven System would ever have been built. The New York & New Haven entered upon the scene in 1844 and in return for their rights, the Housatonic R. R. had trackage rights over the N. Y. & N. H. R. R. for many years.

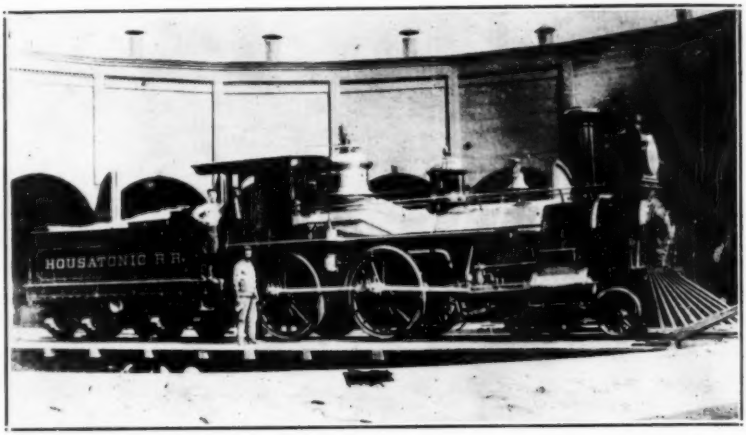
In 1882 the Housatonic acquired the portion of the New York, Housatonic & Northern R. R. between Brookfield Jct and Danbury. In 1886 it acquired the New Haven, Derby & Ansonia, a little road of 10 miles and the same year it acquired the Danbury & Norwalk, a road of 36 miles connecting those two cities with branches to Ridgefield and Hawleyville. Thus, the Housatonic R. R., with its main line and branches was well over 100 miles in length and occupied a strategic position in western Connecticut, but subject to competition with the Hudson River and Harlem roads. Connections at Bridgeport either via steamer or with the N. Y. N. H. & H., or transfer service at Wilson's Point for the Long Island R. R. were at the south while in the north it connected with the Boston & Albany and the New York & New England for the east, it stood in a position to command its share of business, not only on the north and south business but the east and west from Boston and New York. Finally, on July 1, 1892, the New York, New Haven & Hartford R. R. leased the Housatonic R. R. and it was merged with that company on March 28, 1898.



H. R. R. #3 at Pittsfield, Mass. Rogers. 1869. Courtesy of C. B. Burr

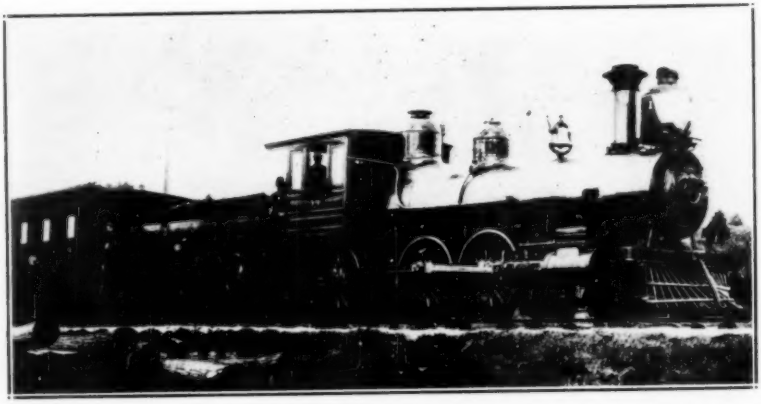


H. R. R. #4. Rogers. 1872. Courtesy of C. B. Burr



Courtesy of Ry. & Loco. Hist. Soc.

H. R. R. #8. H. R. R. 1874.



H. R. R. #13. Rogers, 1888. Courtesy of C. B. Burr

Turning now to the locomotives of this road, many of the early engines were either sold or scrapped so that if they ever carried numbers on the Housatonic, it is impossible at this late date to assign them—hence these early engines are listed in chronological order.

	Housatonic	M W Baldwin	#138	12- 4-1839	4-2-0	Gone before 1856	
	Pequonnock	M W Baldwin	140	12- 4-1839	4-2-0	Gone before 1856	
	Bridgeport	Rogers K & G	26	11-25-1840	4-2-0	Gone before 1856	
	Berkshire	Rogers K & G	33	11- 8-1841	4-2-0	Gone before 1856	
	Stockbridge	Rogers K & G	36	1-27-1842	4-2-2	Gone before 1856	
	New York	Rogers K & G	40	12-28-1842	4-2-2	Gone before 1856	
	Albany	Rogers K & G	41	12-28-1842	4-2-2	Gone before 1856	
	Connecticut	Rogers K & G	88	10-19-1846	4-4-0	13½x18" 54"	
	Massachusetts	Rogers K & G	89	10-19-1846	4-4-0	13½x18" 54"	
						Sold—1856	
	Litchfield	Rogers K & G	107	9-22-1847	4-4-0	13½x20" 60"	
						Scrap—1869	
	Fairfield	Rogers K & G	111	11- 1-1847	4-4-0	13½x20" 60"	
	Housatonic	Rogers K & G	191	10-22-1849	4-4-0	13½x20" 60"	
	Antelope	Rogers K & G	288	11- 3-1851	4-4-0	13½x20" 60"	
	Reindeer	Rogers K & G	289	11-13-1851	4-4-0	13½x20" 60"	
	Pittsfield	Amoskeag	77	12-22-1852	4-4-0	15x20" 60"	
	Taghonic	Amoskeag	80	2-16-1853	4-4-0	14x20" 54"	
		Sold—Hudson & Berkshire R. R.					
	Falls Village	Rogers K & G	435	10-31-1853	4-4-0	13½x22" 60"	
		Sold—Connecticut Western R. R.					
1	Useful	Housatonic R. R.		1871	4-4-0	14x22" 54"	
1		Rogers	3212	1883	0-4-0	15x22" 50"	
451		Re 2903—Sc 5-25-1905					
2	Samuel Willets	Rogers	J710	5-28-1870	4-4-0	15x22" 60"	
452		Scrap—1895			4-4-0		
452		Schenectady	2741	1888	4-6-0	18x24" 60"	
		Ex NH #552 Re 929—Sc 1-31-1922			4-6-0		
3	W. H. Barnum	Rogers	J669	11-29-1869	4-4-0	15x22" 60"	
453		Scrap prior to 1900			4-4-0		
453		Rhode Island	29227	3- 1904	0-6-0	19x26" 51"	
		Re 2331—Sc 3-31-1935			0-6-0		
4	C. K. Averill	Rogers	2167	7-31-1872	4-4-0	14x22" 62⅝"	
454		Scrap prior to 1900			4-4-0		
454		Rhode Island	3063	1895	0-6-0	18x24" 45"	
		Re 2542—Sc 7-1-1923					
5	H. W. Franklyn	Rogers	2300	7-14-1873	4-4-0	15x22" 60"	
455		Scrap prior to 1895			4-4-0		
455		Rhode Island	3064	3- 1895	0-6-0	18x24" 45"	
		Re 2332—Sc 3-31-1935					
6	H. S. Leavitt	Rogers	2373	11-15-1873	4-4-0	15x22" 62"	
456		Scrap prior to 1900					
456		Rhode Island	25610	7- 1902	0-6-0	20½&31x26" 51"	
		Re 2300—Active				19x26" 51"	
7	Horace Nichols	Rogers	J784	10-16-1871	4-4-0	15x22" 60"	
457		Scrap prior to 1893					
457		Rhode Island	3065	3- 1895	0-6-0	18x24" 45"	
		Re 2557—Active					
8	Lee	Rogers	508	7-18-1854	4-4-0	14½x22" 54"	
8	Not Named	Housatonic R. R.		1874	4-4-0	15x22" 60"	
	Rebuilt	Housatonic R. R.		1886			
458		Scrap prior to 1900					
458		Rhode Island	25611	7- 1902	0-6-0	20½&31x26" 51"	
		Re 2301—Sc 12-1935					
9	New Milford	Rogers	652	2-25-1856	4-4-0	14½x22" 54"	

9	Not Named	Rogers	#3632		1886	4-4-0	18x22"	66"
459		Re 1771—Sc 2-1914				4-4-0		
10	Bridgeport	Rogers	783	7-24-	1857	4-4-0	14½x22"	54"
10	Not Named	Rogers			1886	4-4-0	18x22"	67"
460		Re 1773—Sc 4-2-1907				4-4-0		
11	Berkshire	Rogers	J556	1-15-	1867	4-4-0	14½x22"	54"
461		Scrap prior to 1895						
461		Rhode Island	3066	4-	1895	0-6-0	18x24"	45"
		Re 2543—Active						
12	N. Thayer	Rogers	J580	5-16-	1867	4-4-0	14x22"	60"
12	Not Named	Rogers	1804		1881	4-4-0		
462		Scrap prior to 1896						
462		Rhode Island			1896	4-4-0	17x24"	69"
		Re 1903—Sc 4-30-1915						
13	Great Barrington	Rogers	J631	1-22-	1869	4-4-0	14x22"	60"
13	Not Named	Rogers	3942		1888	4-6-0	18x24"	58
463		Re 924—Sc 12-31-1922				4-6-0		
14	David Leavitt	Rogers	J631	8-10-	1869	4-4-0	14x22"	60"
464		Scrap prior to 1895						
464		Rhode Island	3067	4-	1895	0-6-0	18x24"	45"
		Re 2544—Sc 6-1-1923						
15	D. S. Draper	Rogers	J750	2-17-	1871	4-4-0	15x22"	60"
465		Scrap prior to 1902						
465		Rhode Island	25612	7-	1902	0-6-0	20½&31x26"	51"
		Re 3202—Active				0-6-0	19x26"	51"
16	C. A. Peck	Rogers	J784	10-	4-1871	4-4-0	15x22"	60"
466		Scrap prior to 1900				4-4-0		
466		Rhode Island	25613	7-	1902	0-6-0	20½&31x26"	51"
		Re 2303—Sc 1-31-1935				0-6-0	19x26"	51"
17	G. W. Peet	Rogers	J831	7-24-	1872	4-4-0	15x22"	54"
467		Scrap prior to 1900						
467		Rhode Island	25614	7-	1902	0-6-0	20½&31x26"	51"
		Re 2304—2323—Sc			1-31-1935		19x26"	51"
18	G. H. Noble	Rogers	J831	7-31-	1872	4-4-0	15x22"	54"
468		Scrap prior to 1900						
468		Rhode Island	25615	7-	1902	0-6-0	20½&31x26"	51"
		Re 2305—Active				0-6-0	19x26"	51"
19	W. D. Bishop	Rogers	2375	11-15-	1873	4-4-0	15x22"	62"
469		Scrap prior to 1895						
469		Rhode Island	3068	4-	1895	0-6-0	18x24"	45"
		Re 2545—Sc 7-31-1925						
20*	A. B. Mygatt	Rogers	2433		1875	4-4-0	17x22"	56"
470		Re 1953—Sc 1-1905				4-4-0		
21†		Rogers	2308	7-	1873	4-4-0	17x24"	60"
21	Samuel Peck	Rogers	2902		1882	4-4-0	18x22"	66"
471		Re 1776—Sc 4-30-1915				4-4-0		
22†		Rogers	2310	7-	1873	4-4-0	17x24"	60"
22	H. C. Cogswell	Rogers	2903		1882	4-4-0	18x22"	66"
472		Re 1772—Sc 4-1915				4-4-0		
23	E. Leavitt	Rogers	2763		1881	4-4-0	18x22"	66"

*The "A. B. Mygatt" was purchased from the Connecticut Western R. R. and was named the "Lakeville" on that road.

†Nos. 21 and 22 were originally built for the Indiana, Bloomington & Western Ry. They were subsequently returned to the Rogers Works, sold to the Housatonic R. R., who in turn sold them to the Central Massachusetts R. R. where they were numbered 1 and 2. When the latter road was taken over by the Boston & Lowell they were placed on the St. Johnsbury & Lake Champlain where they were numbered 11 and 12. Housatonic #53 was originally built for the New York & New England under #160 and subsequently sold to the Housatonic.

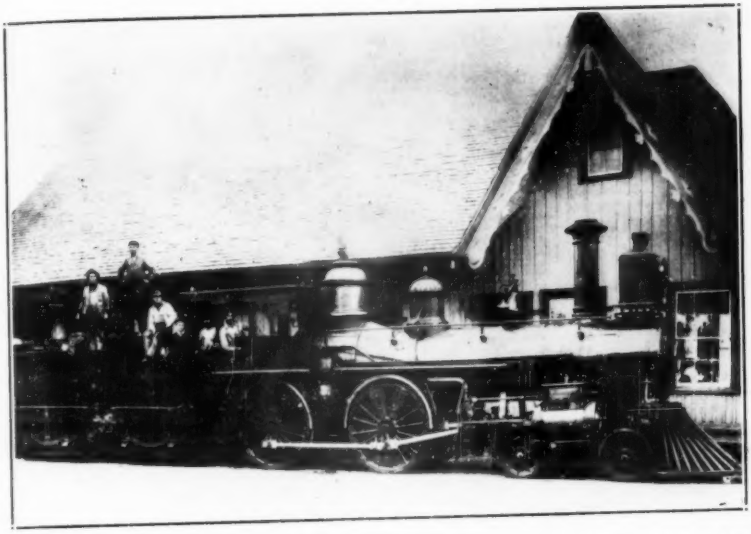
The letter "J" prefixed to the builder's number indicates the Order number—not the builder's number.

473		Re 1777—Sc 10-10-1907			4-4-0			
24	J. B. Peck	Rogers	#2764	1881	4-4-0	18x22"	66"	
474		Re 1778—Sc 5-8-1917			4-4-0			
25		Rogers	3731	1887	4-4-0	18x22"	62"	
475		Re 1747—Sc 8-18-1919			4-4-0			
26		Rogers	3732	1887	4-4-0	18x22"	62"	
476		Re 1748—Sc 2-1917			4-4-0			
27		Rogers	3938	1888	4-4-0	18x24"	66"	
477		Re 1722—Sc 2-1917			4-4-0			
28		Rogers	3935	1888	4-4-0	18x24"	66"	
478		Re 1723—Sc 8-18-1919			4-4-0			
29		Rogers	3943	1888	4-6-0	18x24"	58"	
479		Re 927—Sc 5-1923			4-6-0			
30		Rogers	3940	1888	4-4-0	18x24"	66"	
480		Re 1724—Sc 8-18-1919			4-4-0			
31		Rogers	3944	1888	4-6-0	18x24"	58"	
481		Re 928—Sc 12-31-1915			4-6-0			
32		Rogers	4104	1889	4-6-0	18x24"	58"	
482		Re 925—Sc 5-1923			4-6-0			
33		Rogers	4127	1889	4-4-0	18x24"	66"	
483		Re 1721—Sc 11-20-1919			4-4-0			
34		Rogers	4124	1889	4-6-0	18x24"	58"	
484		Re 926—Sc 5-1923			4-6-0			
35		Rogers	4133	1889	0-6-0	18x24"	51"	
485		Re 2519—Sc 6-1923			0-6-0			
36		Rogers	4298	1890	0-6-0	18x24"	50"	
486		Re 2518—Sc 12-31-1915			0-6-0			
37		Rogers	4292	1890	4-6-0	18x24"	58"	
487		Re 922—Sc 1-31-1922			4-6-0			
38		Rogers	4293	1890	4-6-0	18x24"	58"	
488		Re 923—Sc 12-31-1922			4-6-0			
39		Rogers	4296	1890	4-4-0	18x24"	66"	
489		Re 1651—Sc 8-18-1919			4-4-0			
40	Emma	Danforth & Cooke	1154	1875	4-4-0	16x24"	63"	D&N #1
490		Scrap prior to 1903						
490		New Haven Shops		1903	4-4-0	18x26"	69"	
		Re 1507—Sc 1-13-1927			4-4-0			
41	James W. Hyatt	Danforth & Cooke	1367	1876	4-4-0	17x22"	63"	D&N #2
491		Scrap prior to 1902						
491		Rhode Island	25616	1902	0-6-0	20½&31x26"	51"	
		Re 2306—Active			0-6-0	19x26"	51"	
42	R. P. Flower	Danforth & Cooke	1054	1876	4-4-0	16x22"	63"	D&N #3
492		Scrap 1904						
43	Norwalk	Danforth & Cooke	1150	1876	4-4-0	15x22"	42"	D&N #4
493		Scrap prior to 1900						
493		Rhode Island	29229	1904	0-6-0	19x26"	51"	
		Re 2333—Active			0-6-0			
44	Elis T. Hoyt	Danforth & Cooke	1595	1877	4-4-0	18x24"	63"	D&N #5
494		Re 1761—Sc 7-1-1907			4-4-0			
45	Wilton	Danforth & Cooke		1871	4-4-0	14x22"	63"	D&N #6
495		Scrap prior to 1900						
495		Rhode Island 29230		1904	0-6-0	19x26"	51"	
		Re 2334—Active			0-6-0			
46	Danbury	Danforth & Cooke	1714	1878	4-4-0	17x24"	63"	D&N #7
496		Re 1914—Sc 1-1905						
47	Morris Tyler	Rogers	J748	1871	4-4-0	15x22"	60"	NHD&A #1
497		Scrap prior to 1900						
497		Rhode Island	25617	1902	0-6-0	20½&31x26"	51"	
		Re 2307—Active			0-6-0	19x26"	51"	
48		Rogers		1872	4-4-0	15x22"	60"	NHD&A #2
498		Scrap prior to 1900						

498		Rhode Island	#25618	1902	0-6-0	20½&31x26″	51″	
		Re 2308—Active			0-6-0	19x26″	51″	
49	Edwin Marble	Danforth & Cooke		1877	4-4-0	14x22″	63″	NHD&A #3
499					4-4-0			
499		Rhode Island	25619	1902	0-6-0	20½&31x26″	51″	
		Re 2309 Active			0-6-0	19x26″	51″	
50	J H Bartholemew	Danforth & Cooke	1225	1881	4-4-0	16x24″	56″	NHD&A #4
500		Re 2041—Sc 4-6-1907						
51	E. S. Quintard	Danforth & Cooke	1647	1885	4-4-0	17x24″	63″	NHD&A #5
501		Re 1915—Sc 4-30-1915						
52		Rogers	4297	1890	4-4-0	18x24″	66″	
502		Re 1652—Sc 1-6-1921						
53		Rhode Island	2223	1889	2-6-0	20x24″	69″	NY&NE #160
503		Re 525—Sc 6-1-1923						
54		Rogers	4638	1892	4-4-0	19x24″	68″	
504		Re 1411—Sc 2-1-1924						
55		Rogers	4639	1892	4-4-0	19x24″	68″	
505		Re 1412—Sc 4-30-1926						
56		Rogers	4640	1892	4-4-0	19x24″	68″	
506		Re 1413—Sc 8-31-1925						
57		Rogers	4608	1891	4-6-0	18x24″	56″	
507		Re 921—Sc 6-1923						
58		Rogers	4483	1891	4-4-0	18x24″	62″	
508		Re 1719—Sc 11-20-1919						
59		Rogers	4484	1891	4-4-0	18x24″	62″	
509		Re 1720—Sc 5-8-1917						
60		Rogers	4631	1891	0-6-0	18x24″	50″	
510		Re 2517—Sc 6-1923						

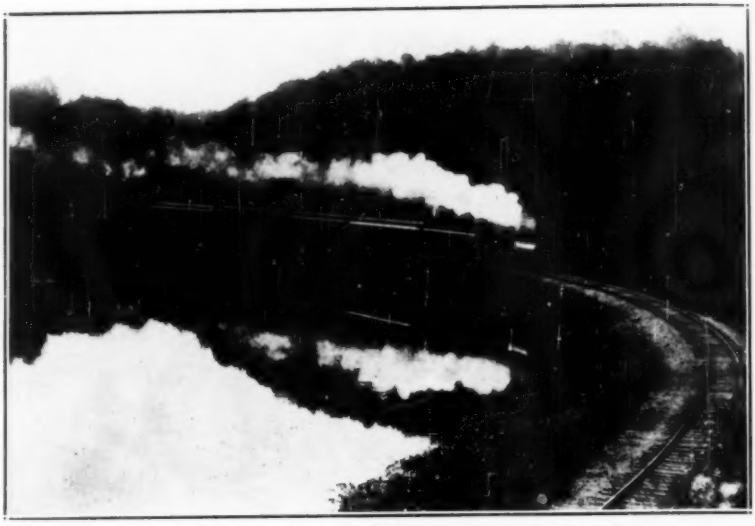
The following engines were purchased by the New Haven R. R.

511	Schenectady	#5422	1900	2-6-0	20x28″	63″	Re 396 Active
512	Schenectady	#5423	1900	2-6-0	20x28″	63″	Re 397 Active
513	Schenectady	#5424	1900	2-6-0	20x28″	63″	Re 398 Active
514	Schenectady	#5425	1900	2-6-0	20x28″	63″	Re 399 Sc 11-1928
515	Schenectady	#5426	1900	2-6-0	20x28″	63″	Re 400 Sc 9-1929
516	Schenectady	#5427	1900	2-6-0	20x28″	63″	Re 401 Active
517	Schenectady	#5428	1900	2-6-0	20x28″	63″	Re 402 Active
518	Schenectady	#5429	1900	2-6-0	20x28″	63″	Re 403 Active
519	Schenectady	#5430	1900	2-6-0	20x28″	63″	Re 404 Active
520	Schenectady	#5431	1900	2-6-0	20x28″	63″	Re 405 Sc 6-1928
521	Schenectady	#5432	1900	2-6-0	20x28″	63″	Re 406 Sc 1-31-1935
522	Schenectady	#5433	1900	2-6-0	20x28″	63″	Re 407 Sc 12-1935
523	Schenectady	#5434	1900	2-6-0	20x28″	63″	Re 408 Active
524	Schenectady	#5435	1900	2-6-0	20x28″	63″	Re 409 Active
525	Schenectady	#5436	1900	2-6-0	20x28″	63″	Re 410 Active
526	Schenectady	#5437	1900	2-6-0	20x28″	63″	Re 411 Active
527	Schenectady	#5438	1900	2-6-0	20x28″	63″	Re 412 Active
528	Schenectady	#5439	1900	2-6-0	20x28″	63″	Re 413 Active
529	Schenectady	#5440	1900	2-6-0	20x28″	63″	Re 414 Active
530	Schenectady	#5441	1900	2-6-0	20x28″	63″	Re 415 Sc 8-1927
531	Schenectady	#5442	1900	2-6-0	20x28″	63″	Re 416 Active
532	Schenectady	#5443	1900	2-6-0	20x28″	63″	Re 417 Active
533	Schenectady	#5444	1900	2-6-0	20x28″	63″	Re 418 Active
534	Schenectady	#5445	1900	2-6-0	20x28″	63″	Re 419 Active
535	Schenectady	#5446	1900	2-6-0	20x28″	63″	Re 350 Sc 10-1928
536	Schenectady	#5457	1900	4-4-0	20x26″	78″	Re 1210 Active
537	Schenectady	#5458	1900	4-4-0	20x26″	78″	Re 1211 Active
538	Schenectady	#5459	1900	4-4-0	20x26″	78″	Re 1212 Active
539	Schenectady	#5460	1900	4-4-0	20x26″	78″	Re 1213 Active
540	Schenectady	#5461	1900	4-4-0	20x26″	78″	Re 1214 Active
541-550	Rhode Island	25590-599	1902	4-4-0	20x26″	78″	Re 1200-1209 6 Active



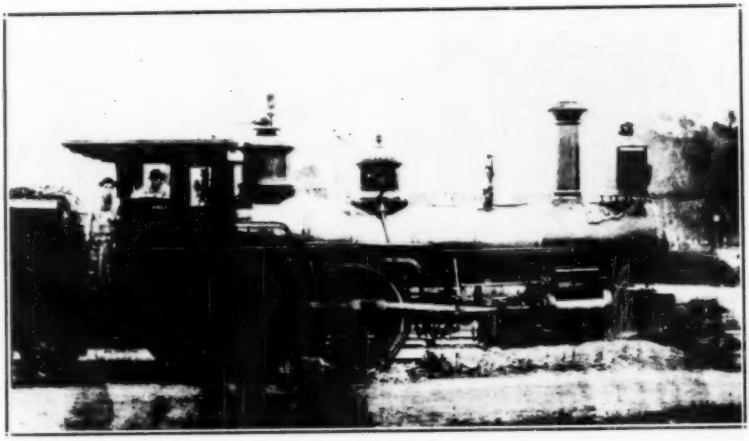
H. R. R. #15. Rogers. 1871. Courtesy of C. B. Burr

H. R. R. #23. Rogers. 1861. Courtesy of C. B. Burr



Courtesy of C. B. Burr

H. R. R. Train on Glendale Curve in the Beautiful Housatonic Valley.



S. L. & N. #4. Rogers, 1871.

SHEPAUG, LITCHFIELD & NORTHERN R. R.

The Shepaug Valley R. R. was authorized by the State of Connecticut, 1866-1868, to build a railroad from Litchfield to some point on the Housatonic R. R. at some convenient point between the towns of Newtown and New Milford. They selected Hawleyville and the 32 mile line was opened in 1872. In 1874 the Shepaug Valley was taken over by the Shepaug R. R. Co., formed by the bondholders for that purpose and in June, 1887, the trustees surrendered it to the Shepaug, Litchfield & Northern R. R. who operated it until July 9, 1898 when it became a part of the New Haven System. On December 11, 1892 the road operated the five mile branch from Hawleyville to Bethel but this was the only addition made in the mileage of the road.

The history of the locomotives of this road is a bit sketchy and the following is produced subject to correction:

1	Shepaug	Rogers	——	9-22-1871	15x22″	54″	4-4-0	
2	Waramaug	Rogers	——	9-26-1871	15x22″	54″	4-4-0	Sold
2		Schenectady	2741	1888	18x24″	56″	4-6-0	MW&C #5
552		Re 452-929 Sc 1-31-1922						
3	Weantanaug	Rogers	——	9-29-1871	15x22″	54″	4-4-0	Sold
3		Rogers	2378	3-20-1874	15x22″	56″	4-4-0	
4		Rogers	——	1871	15x22″	60″	4-4-0	Note
5		N Y N H & H		1868	17x22″	62″	4-4-0	NH #15
555		Sc prior to 1904						

Note: This engine was purchased from the Connecticut Western R. R. and carried the name "City of Hartford" on that road.

The following new engines were assigned these numbers:

551-560	Rhode Island	25600-609	1902	2-6-0	20x28″	63″	154000	200#
561-575	Rhode Island	27027-041	1903	2-6-0	20x28″	63″	154000	200#
576-595	Rhode Island	28877-896	1904	2-6-0	20x28″	63″	148000	200#
596-600	Rhode Island	29191-195	1903	2-6-0	20x28″	63″	148000	200#

551-575 were renumbered 300-324 in 1904 and 6 are still active
576-600 were renumbered 371-395 in 1904 and 16 are still active

With the renumbering of the locomotives in 1904, the following engines were assigned to this series:

480-489	K-1a	Schenectady	1898	20x28″	63″	145000	Ex NH 431-440
490-499	K-1a	Schenectady	1896	20x28″	63″	145000	Ex NH 421-430

At first these engines were assigned Nos. 470-479 and 460-469 as recorded in Bulletin #43. In order to make room for the Baldwin engines in 1905, they were again renumbered as above.

500	K-5	Rhode Island	1895	20x26″	63″	138000	Ex NH 938
501	K-5	Rhode Island	1895				NH 943
502	K-5	Rhode Island	1895				NH 953
503	K-5	Rhode Island	1895				NH 954
504	K-5	Rhode Island	1895				NH 956
505	K-5	Rhode Island	1895				NH 959
506-509	Vacant in the new series						
510-516	K-3	Rome	1889	20x26″	57″	110000	Ex NH 1051-1057
517-518	K-3	Rhode Island	1889				NH 1058-1059
519-524	Vacant in new series						
525	K-4	Rhode Island	1889	20x24″	63″	131000	Ex NH 503
526-535	K-2	Rhode Island	1894	20x26″	63″	129000	NH 266-275
536-545	K-2	Rhode Island	1893				NH 256-265
546-600	Vacant in new series						

The next locomotives listed will be those from the Old Colony R. R.

Development of Railway Signaling

ILLUSTRATED LECTURE
May 10, 1935
Room 1101 Engineering Societies Building
New York City, N. Y.
Before the
Railway and Locomotive Historical Society, Inc.
New York Chapter.

HERBERT S. BALLIET

RAILWAY Signaling Engineering appears to the casual observer to be somewhat of an adjunct to civil engineering. This is, however, not a fact. The results achieved by those who have set themselves up as sponsors for the thorough way in which the railways are now equipped with the most accurate methods, to meet railway operating requirements, for the safeguarding and facilitating traffic is indeed a monument which is prominent in history. These men have an unlimited amount of energy, they are capable of visualizing the many inconsistencies which prevail, look into the future and anticipate train operating requirements and the probable interruption to the signaling system under all conditions of weather and varied train operation. These men are a combination of mechanical, electrical and electro-chemical engineers, expert designers, track engineers, scientists, operating men and braking distance experts, therefore they are truly identified as Signaling Experts, which translated means—"Masters of Signaling."

The first signal observed was light, a white light as compared with darkness, or no light; we are taught by tradition that this was in the Beginning. Singularly this light known as white, when electric lights are used, or yellowish when oil is used, as an illuminant, is the only so-termed light (or indication) in signaling. It is true that many colors are in use but all are produced by the process of placing between the source of light and the observer, a material or covering; this may be dyed cloth, glass, celluloid, etc. The earliest railway signals were those displayed by a man who used his hands and forearms to present the indication, which means instructions to the driver of the vehicle. Then followed the use of flags. Flags were indeed ancient, used on land and sea for war purposes, after that by devious methods as we will learn, first by signals at fixed locations by the use of disks, arms, etc., operated at the ground level, by man, and according to the exactness of railway operation, in order to make available the same devices during darkness, storm, etc., a white light was added thereto as an important signal. Lanterns for night signals, were introduced centuries ago for marine purposes. Thus we observe "light signals" in use for more than 100 years of railway operation. On August 9, 1831, the Captain (ticket collector) of the Mohawk & Hudson, (America) sat on the buggy seat of the tender of the

DeWitt Clinton, and with a tin horn, gave the signal for the train to start. On an early New England railroad the passenger train was not permitted to start on its run until the bell in the church steeple was tolled. Early usage for engine-driver to signal his conductor was to raise a flag on a pole placed on the tender; while the Conductor in turn went atop the car and violently waved his arms to attract the engine crew's attention. Ayres of the Erie (America) strung a cord through the cars and attached a piece of wood to its end—this was the introduction of the bell in the cab, operated by a cord. The earliest use of a headlight was in the late 30's, when a small flat car with a sanded floor on which a fire of pine knots was built, the whale oil headlight replaced this device in the early 40's. Lanterns and flags, were at an early date, hung on the last car of a train as a protection against a rear end collision. "Semaphores" that is to say, wooden arms of varying shapes, were first used in the "Visual telegraph" in Prussia (1700). The most prominent adaptation of such a device was introduced by the Chappe brothers in 1794; this invention was sold by them to the French government for a fabulous sum and that government put it into use for transmitting information as to the progress of war. From this design Gregory (1841) made up and put into use the railway semaphore signal. This signal was at first operated by hand at the ground level, later by stirrups and finally by levers arranged into groups termed interlocking frames, which condition came about because it was better operation and much safer for the employee to have gathered in an assembly at a common location all of the means to manipulate the signals, rather than by hand thrown stands located close to the moving trains. The purpose of railway signals is the transmittal of information to the employees in charge of the operation of trains and to the public at locations where the highway crosses the railway. The fixed signal, i. e., a signal placed at a specified location is the foundation upon which is built the world's transportation machine, the railway.

The earliest railways were located (1806) in Scotland and the United States of America. From their crude beginning we trace the story of the development of railway signaling as it is illustrated—a period of 129 years.

In preparing this record, my object has been primarily to interest, but perchance it typifies the spirit that pervades all who are engaged in this profession, a continual striving after the ideal—a ready adoption of modern discovery and the fruits of technical research combined with the desire that all their efforts in this special branch of railway operation shall result in increased safety and enhanced prosperity to the railway industry.

Hand signals were first used in transportation, in England, on the Stockton and Darlington railway (1825), and on the Baltimore and Ohio railroad, in the U.S.A. (1829). A signalman on horseback preceding the locomotive driven by George Stephenson, the inventor of the steam locomotive, when the first railway train moved over the Stockton and Darlington (1825), carried a flag. This occurrence shows how closely flag signals followed the use of hand-signals. Train operation

was confined to the time interval method for the movement of regular trains subject to the rules prior to the advent of the fixed signal. As soon as trains began running in both directions on single track, sidings to permit the passage of trains were introduced, such a plan brought about operating difficulties which were solved by placing high posts at approximately the midway or center point of these meeting points. They were called center posts, and were adopted as a signal which meant that the train had the right of way to the next turn out of siding.

In (1827) the first fixed signal was installed on the Stockton and Darlington. A disk, resembling a wedge, when turned to face the engineman indicated—danger - stop, when turned edgewise it indicated—all clear, proceed. John Hackshaw, installed a disk signal on the Manchester and Bolton railway, England (1838). It consisted of a disk connected to the movable rails of a switch in such manner that when the rails were moved, the signal operated with them through the means of a handle and balance weight acting upon the bevel wheels and eccentric. A disk which was revolved by chain and pulleys was used by the London and South Western, England, (1840). A red disk, four feet in diameter was used on the New Castle and Carlisle, England, in the same year. The disk was fixed to a revolving pole fitted with a handle to turn it. The New Castle and Frenchtown, U. S. A., adopted a red disk, four feet in diameter (1840). It was the counterpart to the one just described, except that the word "Danger" was painted on the disk, the exhibition of this signal was considered as an indication to block the line; a lamp was attached to the revolving pole to provide for the night indication. The John Fowler wooden disk, or a red lamp, was used on the Stockton & Hartlepool, England, (1840). It consisted of a pole some 30 feet in height fitted with a pulley at the top and a rope by which the signal was hauled up indicating that certain trains might pass the junction and other trains not pass. Junctions were protected by pointsmen, located in the pointsman's box which was a part of the signaling pole arrangement. For many years the London and South Western, England, used as the standard distant signal a disk having an aperture on one side and a lamp fixed under the disk fastened to the same spindle. The presentation of the disk with the closed part to the left hand indicated danger to an approaching train, and when the edge of the disk was presented, safety was indicated. The Brighton, England used a circular disk with a peculiarly shaped opening near the center and a heavy reinforcement near the bottom of the disk. A circular disk, perforated with a rectangular board below, at right angles to this disk was used on the Great Western, England, (1844). The disks, mounted on a horizontal axis, carried in bearings, were fixed on top of a pole; it was used as a distant signal in distinction from the semaphore type. The Caledonian, England, (1846) used a peculiarly shaped disk signal indicating danger, caution, and clear. This type in conjunction with two semaphore signals was in use (1874) in the Victorian Station, London. They were all assembled on the same mast to provide indications for the relief of the station yards and facilitate the movements therein; these devices were operated from an interlocking machine.

The rectangular board signal was placed in use at the opening of the Liverpool and Manchester, England, (1830). The board was attached to a post and was hand-operated. The board was surmounted by a light which was fastened to the same post and provided for the night indication. On the board was painted the word "Danger"; when crosswise of the track and facing an approaching train it indicated stop; when set parallel to the track, clear, a safety was indicated. They were placed on high poles so as to be easily distinguished.

The dispatcher's signal was put in use on the New Castle & Frenchtown, (USA) in 1832. At first they used a flag, later a peach-basket, inverted. These signals were displayed by raising and lowering them. Three indications—1—Signal at top of mast, train leaving either end of the system; 2—at other stations signal at half-way; 3—as each train passed each station signal was raised to top of mast and lowered when train had passed next station. Poles some 30 feet in height located about 3 miles apart were used as masts. The white signal was used for normal operation, and black for a disabled or detained train.

The cross bar and lamp was introduced, for night signaling only, on the Liverpool & Manchester, England (1834). It consisted of a crossbar above which was a disk fixed to it at right angles, indicating danger when the crossbar was seen and when the disk was presented—safety. The Great Western, England, introduced it in 1841.

Mechanical flag signals were introduced in England (1834).

An approach light signal to a fixed signal was used at night on the Liverpool & Manchester, England (1834). Dryden invented the American type in 1907.

From 1834 to 1874 English railways used numerous types self-acting time or space interval signals, for the purpose of showing the length of time elapsed since the last train passed a given point. The earliest use of a similar device in America, was the Foster (1872). This device indicated minutes or miles between trains at a given point. Abroad and in America colored alcohol was used as an indicator for similar purposes.

The ball signal was put in use on the Great Western, England (1837) and introduced in America at a crossing of the New York & New Haven (1852), where it still serves the railways in 1935. The original was known as the "high ball signal." It consisted of a canvas ball hauled to the top of a pole by a rope, when hoisted it indicated all clear, and when lowered, danger; an ordinary stable lantern was hooked on at night instead of the ball. Many of these signals are still in use in 1935.

A vane shaped signal, surmounted by lanterns for night use, was in use on the Grand Junction, England, (1838); this was a danger signal, the Great Western England, used (1844) same as a caution signal.

The kite shaped signal (1838) consisted of a light iron frame, fixed to the top of a post, and covered with canvas to display a caution or danger indication.

The D shaped board signal was used (1838) on the Grand Junction, England, it was hand operated, the board being fixed on a spindle.

Semaphore signals in the visual telegraph were used (1700) in Prussia, and in 1840 Gregory put our adaptation of this aim in use on the London and Croydon, England. This proved perhaps to be the most important step in the development of railway signaling. It was a three position lower quadrant type; Gregory set the world standard when he invented the lower quadrant type and constitutes the first step in displaying the indication by position, by day, instead of by form. The indications were displayed to the left of the mast, as seen from an approaching train. Lamps with red, green and white lenses were used at right. They were mounted on top of the pole on a vertical shaft, and worked in concord with the arms. These signals were operated by a handle located near the base of the post. Gregory at the soliciitation of railway officials (1841) representing England and Scotland arranged the semaphore to operate in two positions in the lower-quadrant only. This type was made standard on the Liverpool & Manchester, England (1841) horizontal arm indicated stop and downwardly, inclined, proceed. The Brighton, England, put in use (1844) a double semaphore with signal locking apparatus. In America were used the Fogerty semaphore train order (1871); the Evans type, with track treadle control (1874) on the Fitchburg automatic block (1879); electro-pneumatic (1882); Cummings illuminated (1885); Boston and Albany left hand lower quadrant, (1885); the Black, a mechanical semaphore, controlled by a track device (1886); Koyl parabolic semaphore (1885); the Spiral Semaphore, on the Lake Shore & Michigan Southern (1887); the Cox-Black, a 3 position lower quadrant type on the Jeffersonville, Madison and Indianapolis (1887), the Hudson on the Chesapeake and Ohio (1890); square-end arms pulled by a wire were drawn into a vertical slot in a wooden pole, when proceed is indicated, horizontal for stop, on the New York Central and Hudson River (1890); Lattig low voltage semaphore on the Central Railroad of New Jersey (1893). The electric motor was arranged upon a bracket near the top of the mast and connected to a balance lever. The motor, wound a cable on a drum, operated the lever which in turn through the medium of an up and down rod moved the arm to the proceed position, lower quadrant; the arm returned to the stop position by gravity.

Lattig semaphore arms illustrated by rows of incandescent electric lights (1895); Coleman 3—position (1896).

Sometimes the lamps were fitted with internal colored glasses movable either in a vertical or revolving direction, in England, but the usual plan was to have a fixed lamp and movable external colored spectacles (1874).

A disc signal (Martin type) consisting of a light frame work, 5 feet in diameter, covered with canvas and tin, having a semi-circular aperture extending close to the outer edge, and the disc mounted on a control pivot fixed to a post, hand-operated, was in use (1840) on the London and South Western, England. A similar device, except that two circular discs mounted on a horizontal plan were used (1840) on the London and Brighton and Lancashire and Yorkshire, England.

The New Castle and Frenchtown (America) adopted (1840) a red disc; it was four feet in diameter, and attached to a revolving pole, with

a handle to turn it, the word "DANGER" was painted on the disk. Exhibition of the red disk was considered as an indication for blocking the line. A lamp for the night indication was attached to the revolving pole.

A distant signal, of the disc type, was used (1840) on the London and South Western, England. It had an aperture on one side and a lamp fixed under the disc on the same spindle. Two discs mounted on a horizontal axis, carried in bearings, fixed on top of a post, were (1846) used in England, some lines used it as a line signal only. The Skelden type, worked on the principle of a counter-weighted wire for controlling the semaphore arm, and was introduced on the North British, Scotland. This is the foundation for the operation of all wire-connected signals. The semaphore type was (1852) used on the Great Northern, England. The railway was completely equipped when road was put in service. The fish tail type of distant signal, was adopted by the Brighton, England, (1874), because of its distinctive shape therefore making it more prominent. This shape is an adaptation of the notched end of the weather vane. The Johnson type, America, was in use in 1894. The Carter type, an arrangement of reflected light, was introduced (1896) on the Chicago and Northwestern America. This type was endorsed, but not recommended by the American Railway Association. The initial step in providing for the night indication a distinctive yellow light for caution, was (1899) taken by the New York, New Haven and Hartford, America; this is the Baird lens. Yellow was used (1901) for the night indication for semaphore signals on the Cleveland, Cincinnati, Chicago and St. Louis, America. An elcetro-gas operated distant semaphore was (1903) in use on the Chicago Burlington and Quincy, America. The Carter type was (1922) used on the Belgian State railways.

A station signal, for protecting a train standing in a station, consisting of a red disc fixed on a revolving pole with a handle to turn it was (1840) used on the New Castle and Carlisle, England. The Forsythe light type (1846) was in use on the Edinburgh and Glasgow, Scotland. The Bean atmospheric type on the Old Colony, America (1877). The Cox semaphore type was invented in 1886, and the Westinghouse, both American, in 1887. The Coleman 3 position semaphore on the Atchison Topeka and Santa Fe, America, (1898).

Fog signals of the audible type were (1841) introduced in England, by Cowper. Following this introduction many contrivances were used to announce that the signal is in the stop or danger position. In 1865 the North British, Scotland, signaled in the cab of the locomotive, by the use of a bell or a whistle. This system was substantially the same as used by the Northern of France (1874). Burn, England, (1873) installed a device to permit the signalman to sound the whistle of an approaching train. As late as 1910 Belgian State railways used in double track operation an audible fog signal to supplement the distant signal. The District Railway, England, (1910) used an automatic fog signaling system. Rousseau, America (1875) provided an extra signal to be used in foggy weather. It was a track device which operated the whistle on the locomotive. It was put into use (1876) on the New York and Harlem, America.

The Controlled Manual Block signal was (1841) put in use on the Great Western; the metropolitan District and on Chatham and Dover (1872); South Eastern, Chatham, London and Southwestern, Brighton and Great Eastern (1875), all in England. The Sykes (English) type was put in use (1882) on the New York and Harlem, America, also the Johnson type on the same road (1891). The Leonard type (1902) on the Chesapeake & Ohio, America.

The flag station signal was introduced (1842) on the Stockton & Hartlepool, England. A lighted candle placed in the window of a station indicated that the driver was to stop to take up passengers.

The disc or arm signal, a very unique arrangement of discs—one or two—attached to the upright—one or two straight arms with attachments to ends of each arm—to indicate in greater detail; all discs or arms were identified with lettering to correspond with information displayed. The Great Western, England, used the type in 1843. The same railway (1844) at a junction used a post for the support of a perforated disc on top and a board with four large square holes cut in face of same.

The arm and vane signal was used on the Great Western, England, (1844).

The distant rectangular board (1844) was used on the Great Western, England.

The light signal came into use in 1842 (Forsythe) in Scotland. It first applied at a grade crossing of the Philadelphia and Trenton and Reading, America (1866). Westfall, America (1870) invented the fixed signal box, having glass slides of two or more colors with a horizontally reciprocating light. Spang, America, (1873) invented The Geisler tube type.

The color and position signal (Forsythe 1846) on the Boston and Albany, America, (1882) consisted of a semaphore arm and lights. Two white lights displayed horizontally indicated stop; 2 green vertical—proceed or clear.

The cross bar and end pieces, a by-product of the plain crossbar type was (1847) appropriated in England for the "up" and "down" lines, in the latter case the crossbar was fitted with end pieces or horns pointing downwards.

The disc and arrow signal (1847) was the main type on the Bristol and Exeter, England, and as a caution signal on the Great Western, England.

The crossbar or pole target signal was (1847) adopted by the Greatwestern England. The Michigan Southern and Northern Indiana, America (1855) used it at grade crossings and in yards. In the same year the Erie and Kalamazoo had it in use.

The train order signal is distinctively American, because the train order was originated on the Erie railroad by Superintendent Minot. The Erie used (1851) banner signals at train order offices in combination with the Morse telegraph for dispatching trains; in the same year the Auburn used train-order signals. A wooden arm more properly a pivoted blade, was in use (1860) on the New England and the New Haven. On the Pennsylvania (1868) the train dispatcher could set to stop a train, a

signal at any station, however distant by the use of a selective device which was operated over a Morse telegraph circuit. The Welch type of banner box and semaphore were (1868) in use on the Pennsylvania. The Stewart (Phelps and Stewart) (1869) was an electric device. The gas lighted, Fogerty semaphore was invented in 1871. The Harvey colored signal board within a box for daylight use and lanterns at night was invented in 1874. The boat jack type (1880) was in use on the Lake Shore and Michigan Southern. The banner box (Ireland) was in use (1885) on the Lehigh Valley. A two arm two position lower quadrant semaphore was in use (1885) on the Chicago Milwaukee and Saint Paul. The Ohio and Mississippi (1887) used the center pivoted two position type. The Kanawha and Michigan had in use (1889) a low switch-stand type. The Newport News and Mississippi Valley (1890) used the Yarrington signals. The Stewart-Hall electric enclosed disc was in use on the Central Railroad of N. J. (1892). The Mozier 3 position both upper and lower quadrant semaphore (1896) was on the Atchison Topeka and Santa Fe. The Connors automatic type was invented in 1902. The box type (1922) was standard on the Missouri Kansas and Texas.

The locomotive cab signal made its appearance in 1850, in England, it was a contacting device. The Anderson (crockodile) was introduced on the Callander and Alban, England, and the North British, Scotland (1865). The Ager type (1871) was in use on the London, Chatham and Dover, England. The Northern of France (1872) had in use the crockodile type. The North British of England, (1874) had in use an audible type. The Miller track circuit controlled (1901) was used by the New York Central and Hudson River (America). The colorlight type was (1901) on the Delaware Lackawanna and Western, America controlled by alternating current track circuit. The 3 indication (position light) was (1923) introduced by the Pennsylvania, America; the 3 indication with whistle and acknowledger (1926); the 4 indication, Coder, (1927); the 4 indication continuous, with whistle and acknowledger (1929) and in 1933 the Coder system for operating wayside and cab signals.

The audible electric signal (Walker) was used (1851) by the South Eastern England, exclusively for block signaling.

Signals to protect drawbridges were in use on the Belvidere and Delaware America (1854). The Edgecomb type was invented in 1866. The New York and Harlem (1871) placed in service the Hall type, it was an enclosed disc type. The Tobey type was invented in 1873. The Old Colony, America, used (1876) the Robinson electro-mechanical disc type. On the same road the Bean atmospheric type (1877). In 1884 the Central Railroad of New Jersey, America used a number of draw bridge signals worked by a gear.

The revolving, hand-operated, banner signal (1856) was used in signal towers for the purpose of giving information to approaching trains. These were of the two way or indication type. In 1880 that road had in use the three way type. The Pennsylvania Steel Company top-of-mast banner or disc, electrically controlled (1880) was put in use on the Old Colony, America. Ramsey, America (1887) invented a revolving signal for use in connection with an interlocking signal system.

The lamp signal (1855) was invented by Spafford, America. It consisted of a lamp within a boxlike structure which was displayed to an approaching train; when desired to not display the signal a door was operated from a lever so as to prevent the view of the signal lamp.

The position—light—signal was patented by Lennon (1858). It consisted of a square container in which is housed a fount containing oil upon which is mounted a wick burner. The so termed lamp is attached to a lever stand. The lever is arranged to stand in the vertical or the 45 degree position to the left. The Pennsylvania, America, (1915) put in use this type of electric light signal controlled by track circuit.

The gate signal, resembling a farm gate, placed over or across railway tracks was (1860) used on the Belvidere and Delaware, America. This type is still (1935) in use.

The 3 position upper quadrant type was (1900) in use in Germany. The Loree-Patenall, America, was invented in 1903. The electro-pneumatic type was (1906) in use on the Pennsylvania, America. On the roads of Austria and Belgium (1906), the upper left hand quadrant type (1906) was put in use on the New York, New Haven and Hartford, America. In October, 1906, the Railway Signal Association recommended changing the signal so as to give the proceed indication in the upper right quadrant. The Cade type of 2 position upper quadrant semaphore (1906) was in use on the Northern Pacific, America. The Blake upper quadrant dispatcher's control type (1908) an electric motor type was put in use. The Clark and Moak (General Electric Company) type, 3 position, top of mast, was in use (1908) on the Baltimore and Ohio, America. In 1908 the Hall type H was put in use. The Hall type L was in use (1917) on the New York Central, America. The Loree-Patenall type was introduced on the Baltimore and Ohio, America in 1908. In the same year the American Railway Association adopted this latter type as recommended practice.

The clockwork signal (1862) was invented by Imray, England. The Rousseau, America, type (1862) was controlled by momentary currents. The New Haven, America (1866) had in use the Hall type. The Hendrickson signal was invented in 1873. The Union Electric Company design (1878) was put in use on the Fitchburg, America. The Gassett and Fisher type (1879) was also used on the Fitchburg. The Rousseau and Smith type (1882) was used on the New York, New Haven and Hartford, America; also on the Boston and Albany, and the Providence-Worcester, America, in 1883. A design of this type (1889) consisted of applying the principle to the operation of a semaphore signal. A weight like that of a grandfather's clock was used to operate same, the weight had to be wound after the passage of every 20th train.

The automatic block signal was (1861) introduced on the Bristol and Exeter, England. The Robinson clockwound disc (1870) was in use on the Western New York and Pennsylvania, America. The Hall enclosed disc (1871) was put in use on the New York and Harlem, also the Eastern, America. Robinson enclosed disc (1872) was in use on the Philadelphia and Erie, Baltimore and Ohio, and Philadelphia, Wilmington and Baltimore, America. The original Hall disc was changed to the

closed circuit plan (1872) and put in use on the New York and Harlem and Eastern, America. The Spang enclosed disc of the normally at danger type was in use (1872) on the Philadelphia and Reading, America. The Robinson electro-mechanical type of disc was in use (1876) on the Boston and Lowell and the Boston and Providence, America. They were track circuit controlled. The same type was (1877) installed on the Fitchburg, America. The electro-pneumatic semaphore, controlled by track circuit, was put in use (1879) on the Fitchburg, America. The top of mast revolving banner or disk was put in use on the Old Colony, America (1880). In this system the signal was set to the stop position, automatically, 100 feet before the locomotive reached the signal. The home and distant type, both on the same mast, electro-pneumatic signals were in 1889 in use on the Pennsylvania, America. Hall enclosed disc signals, controlled partly by track-treadle and the balance by track circuit, were (1892) installed on the 8 track terminal installation of the Illinois Central, America, for handling traffic to the Worlds Fair. The Wilson design of normal danger circuits was (1892) put in use in the Hall enclosed disc system on the New York Central and Hudson River, America. In 1893 the Lattig low voltage motor semaphore was put into use by the Central Railroad of New Jersey. The home and distant signals, of the Hall enclosed disc type, both on the same mast were put in use (1893) on the Lehigh Valley, America. The Pennsylvania, America used pneumatic signals for automatic blocking of trains in 1893. The direct current style B motor operated semaphore signal (U. S. & S. Co.) (1898) was put into use on the Atchison Topeka and Santa Fe, America. The first adaptation of placing the up-and-down rods within the signal mast were (1897) put into use on the Pennsylvania and Michigan Central, America. They were the Style C of the Union Switch and Signal Company. The 3 position automatic type, working in the lower quadrant (1900) were used on the Pennsylvania, Lines West, America. Electro-pneumatic semaphores were (1900) used on the Boston Elevated, America, on railway using electric propulsion. In 1902, the Grately and South Western, England, put in use low pressure pneumatic signals. Color-light, without moving parts (1904) were put in use on the East Boston Tunnel, America. The alternating current motor operated lower quadrant home and distant semaphores on the same mast were (1906) put in use on the New York Central and Hudson River, America. They were on the heavy suburban electrified line in the New York City zone and of the General Railway Signal Company model 6 type. The earliest adaptation of alternating current track circuits on a steam operated road (1906) was on a line of the Union Pacific, America, where Hall enclosed discs and Union Style B semaphores were used. An electric light type was (1906) put in use on the electrified lines of the Long Island, America. In 1906 the 3 position electro pneumatic type was placed in service on the Philadelphia, Wilmington and Baltimore, America. The absolute permissive block control for single track operation, was introduced (1911) by the General Railway Signal Company on the Toronto Hamilton and Buffalo (America). The Oahu Railway, of Hawaii in 1916, installed on 23 miles of its single track line, the 3 position upper

right hand quadrant semaphore, operated by direct current low voltage, style 2A, General Railway Signal Company mechanisms. Many interesting signaling details are here in use.

The enclosed disc signal was considered to be the only proper method to provide good working for a signal which would fill all conditions of weather, and make possible economic operation and be supervised and maintained by a limited number of men. Rousseau invented such a signal (1862), it was made up of a broad circle of metal painted red enclosing a disc of similarly colored glass the whole of which is rotated in one direction only by clockwork and in turn propelled by weight. The Hall Type was introduced on the New Haven (1864) and in the same year on the Hudson River, America. The disc was normally out of sight, i. e., down, thus indicating proceed; to display the stop indication the disc was pulled up by the use of gravity battery. The Robinson type was (1870) used on the Western New York and Pennsylvania, America. The Hall wire circuit control was (1871) put in use on the New York and Harlem, America. In 1871 this type of signal was combined with a battery house or shelter. The track circuit replaced track-treadle, or wire circuits, to a limited extent beginning in 1872. The first control of this type was applied to the Robinson signal on the Philadelphia and Erie, America. The Spang type was in use (1872) on the Philadelphia and Reading, America. The Union electric automatic signal was patented in 1872. In 1873 Robinson invented the double disc. The Rousseau and Smith type was used (1888) on the New York, New Haven and Hartford, America. The Hall type was (1892) in use on terminal territory on the Illinois Central, America.

The banner box signal, a type of enclosed disc was in 1863 used in the manual block system. The Pennsylvania and Delaware Lackawanna and Western, America, used a signal of this type in 1885.

The manual block signal was installed on the Philadelphia and Trenton, America, (1863-64). The Cox-Black 3 position lower quadrant semaphore (1888) was in use on the Jeffersonville, Madison and Indianapolis, America. The Utica and Black River, America, had in use (1863) a system where two arms were mounted on the same mast—one for each direction—3 roundels in each spectacle. The Coleman type was (1896) in use on the Atchison Topeka and Santa Fe, America, the Cox-Black type was (1887) in use on the Kentucky and Indiana, America.

The balloon type signal was (1864-1873) in use on the Belvidere and Delaware, America.

The disappearing semaphore arm signal was introduced on the roads of England about 1865. By 1874 it was found insufficient; the absence of the arm as a safety signal was considered poor practice.

The illuminated arm signal came into use as early as 1866. The smashboard signal was introduced on the Belvidere and Delaware, America, in 1868. This is a device which when lowered, or placed across the track forms an obstruction to the passage of trains, or cars. In the same year the Hall type was placed in use on the New Haven, America, and the same type, modified on the New York and Harlem (1871).

Block signals of various types and designed to meet certain requirements according to rule of the road, were adopted. An example will suffice.

The Hudson River, America, in 1863, used a red flag which was raised to the top of the mast by a man when the block was occupied. When the flag was not displayed safety was indicated.

The electro-pneumatic signal was proposed by Robinson (1870). The Fitchburg, America, put it into use (1879) and the Pennsylvania in 1881.

The overlapped signal was introduced by Spang (1872) on the Philadelphia and Reading, America. The Boston and Maine used it in 1878.

The center-suspended arm signal was standard practice (1872-1912) on the Great Northern, England. The arm was mounted in the middle of its length so that half of it worked in the upper quadrant and the other half in the lower quadrant. It was a 2 position signal. The New York Central and Hudson River, America, used it in 1892, and the New Haven in 1906.

The advance signal was (1873) invented by Prall, England, it was of the pneumatic type. The use of advance signals was (1874) introduced in England.

The polarized wireless distant signal came into use in 1873. Spang, in combination with the Robinson track circuit, invented same. Pope patented the identical scheme. The plan which finally was adopted was originated by Buchanan (1901).

An optical signal was (1874) invented by Simmens of Germany.

The high voltage revolving electric motor operated interlocking type was invented by Ramsey and Weir in 1886.

The Color position light signal was (1882) in use on the Boston and Albany, America, also the Old Colony (1886). The electric lighted type was (1921) introduced on the Baltimore and Ohio, America.

The odd signal was of the revolving type, resembling an ordinary folding leaf fan. It was the Bezer design and was used (1895) on the Delaware Lackawanna and Western, America.

The Hall electro semaphore gas type (Coleman patents 1902) was introduced on the Lehigh Valley, America. The Union Switch and Signal Company design was in use (1902) on the Delaware Lackawanna and Western.

The color-light signal was (1904) introduced on the Boston Elevated system, America. The home and distant type on the New York Central and Hudson River (1905). The most prominent application of this type is on the Brooklyn Bridge, New York City, where, due to the heavy city traffic of trains, the signals are spaced only 100 feet apart, and protection is given to following trains by 7 signals at stop between any two trains, moving on the same track.

The snowshed solenoid type of disc signal was (1906) put in use on the Southern Pacific, America.

The Sykes tunnel electric light signal was in use in England in 1908.

The somersault signal was (1922) in use on the Great Northern of England.

Hump Yard signals came into use in America in 1926.

The flashing light gas signal came into use in Sweden (1930).

The story would not be concluded without a brief reference to the matter of highway crossing protection. Prior to the advent of the automobile the old familiar "Stop-Look-Listen" crossing sign gave drivers of slow moving, horse-drawn vehicles adequate warning at most crossings. Today with automobile and auto trucks traveling at speeds often higher than railway trains modern crossing protection provides from the standpoint of the public, the railways, and the drivers of automotive vehicles greater protection than any method other than elimination of the crossing ever undertaken. These devices give 24 hour a day protection and have shown net annual returns up to 113 per cent as compared with watchman and gate protection. The standard of the American railways now rests on the use of a flashing light which produces the effect of a swinging lantern in the hands of someone close by the right of way of the railway.

Modelmakers Show Interest in Old Time Locos

By A. C. Kalmbach, *Editor of The Model Railroader.*

A curious phenomenom in connection with the fast growing hobby of model railroading is a revival in popular interest in older locomotive types. Model fans, in general, are a typical cross section of the general public, and like the general public they formerly were most interested in the largest and most modern power. The New York Central Hudson and Pennsylvania K-4 Pacific, for instance, were by far the most modeled designs. But in 1936 readers of The Model Railroader in a prototype preference poll voted heavily in favor of the Ten-Wheeler classification as the most suitable for model purposes. So far in 1937 the interest seems to swing even more toward 4-6-0 and 4-4-0 designs.

Primary reason for the swing toward older types is the mechanical limitation of the model railroad. The track usually has excessive curvature, a curve scaled down from 30° being not uncommon. Of course a 30° curve is far too sharp for any class of modern power. The larger locomotive models, with engine and trailer trucks modified, would operate over these curves, but not with entire satisfaction. And the model fans couldn't have much larger curves in the usual attic or basement space. So the trend to Atlantics, Ten-Wheelers, Prairies, and American Standards began. The types without trailer trucks gave especially smooth operating characteristics.

The real point of interest comes some time after the model fan first chooses an older type locomotive on account of curve limitations. He studies photos, plans, etc., of older types, and shortly becomes interested in them for their own sake. Apart from considering the American Standard as a means of getting around sharp curves on the attic or basement railroad, he finds that there is real beauty to the design, real pleasure in studying the trim lines. The model fan has undergone a complete metamorphosis from one of John Q. Public to a real railroad fan who can appreciate the good points of any locomotive design.

History of the Chicago & North Western Railway's Chicago Passenger Terminal Station and its Predecessors

Paper read by F. W. HILLMAN, *Ass't. Engr. of Maintenance, Chicago & North-Western Ry., Chicago, Before the joint meeting of the Engineering Div. of Western Soc. of Engineers and the Chicago Chapter, Railway & Locomotive Historical Soc., Oct. 21, 1936.*

THE present Chicago and North Western Railway's Chicago Passenger Terminal Station and all but one of its ten predecessors were built in the area shown by figure 1. Point "C" on this map, at Wells and Kinzie Streets, is just across the Chicago River from and directly north of the building in which this meeting is being held.

That part of the Chicago and North Western Railway shown by dotted lines on figure 1 is the result of the consolidation of three railroads; namely, The Galena and Chicago Union Railway, The Chicago and Northwestern Railway and the Chicago and Milwaukee Railway running respectively west, northwest and north from Chicago. These railways will be referred to hereafter in this paper as the Galena, the Northwestern and the Milwaukee roads. The Galena Road was Chicago's first railroad. Its construction began in 1847 and its first train was run October 24, 1848. This bit of history is given to explain why, as will be seen, there was more than one passenger terminal in service from 1854 to 1871 the year of the great Chicago fire.

The first railroad depot that was built in Chicago, and the first ancestor of the present passenger terminal, was a one story wooden affair built by the Galena Road in 1848. It stood at what is now the southwest corner of Kinzie and Canal Streets or at "A" figure 1.

In 1849 this building was enlarged (figure 2) and a second story added on which was a sort of an observatory. The second story was used as the general office. The one story portion was the original depot. West of the depot was practically open prairie and from the observatory the President, Mr. Turner, often watched for incoming trains with the aid of a long old fashioned Marine Telescope and thus could announce the coming of a train while it was yet as far away as Austin, six miles. This was before the use of telegraph was even dreamed of on any western railroad. The first telegraph line on this road was built in 1856.

In 1851 the third depot (figure 3) which was of brick and stone was built facing on Wells Street and along North Water Street (C figure 1), which ran just north of and parallel to the Chicago River.

The fourth depot was built on the east side of Dearborn Street, three blocks east and to the right of C, figure 1. No picture of it is available. It was a two story building, the lower portion of which was intended for freight purposes, and the upper portion for offices. Passenger trains of the Galena Road ran to and from this building for some time and the second and third stations were not used.

In 1854 the Northwestern Road entered Chicago and erected a station, (figure 4) north of Kinzie Street and along the North Branch of the Chicago River near "B" figure 1. Although the consolidation of this road and the Galena Road had not yet taken place this building was the fifth station built as a terminal in Chicago on what is now the Chicago and Northwestern System. The building was still in existence in 1910, being used as a storeroom by a lumber company at Halsted and Erie Streets. The picture shows it in such use.

In 1855 the Milwaukee Road built into Chicago from the North and erected a one story wooden station in the vicinity of West Chicago Avenue and North Sangamon Street in the upper left hand corner of figure 1. This building passed into the possession of the original Northwestern Road. No picture of this station has been found.

In 1856 the first station built by the Northwestern Road, (figure 4) was removed and replaced by the one shown in figure 5. It was in those days a pretentious structure of wood with a large domed train shed. This was later known as the Kinzie Street Station and was the seventh of our stations in Chicago. This station and the Wells Street Station were used jointly as passenger train terminals from 1864 to 1871.

In 1862-63 Wells Street was filled in making it necessary to remodel the Wells Street Station shown, to that shown in figure 6. It remained in use until the great fire of 1871 when it went up in smoke like much of Chicago.

The next station was a wooden structure on North Wells Street built in 1871 to replace the one burned. No picture of it is available.

The tenth station, the larger building in the foreground of figure 7, was built on the site of the old Wells Street Station, construction beginning in 1880. The President's report of that year stated that when finished it was to be the largest and finest passenger station in Chicago and would allow all of the passenger trains of the three divisions of the Northwestern Road that centered at Chicago to arrive and start from the same depot. The first passenger train arrived at this station May 23, 1881. After several years, it was necessary to add "The Annex," the lower building in back-ground of figure 7.

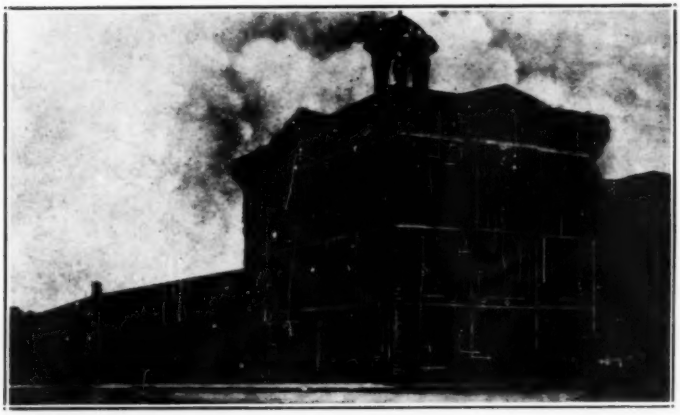
Another piece of history will be of interest. In 1849 the St. Charles Branch Railroad was chartered. On January 3, 1853 its name was changed to the Chicago, St. Charles and Mississippi Air Line Railroad. It was built from the lake front at about what is now the east end of Sixteenth Street west to near the Galena Road at Harlem, now Oak Park. It was intended to build this railroad parallel to the Galena Road west to the Mississippi River, but the Galena Road secured possession of it April 10, 1854. Chicago to Dubuque, Iowa, trains left the Illinois Central Station on the Lake Front and ran over the "St. Charles Air Line" to Harlem where they were combined with a Galena Road train continuing to Freeport on the Galena Road and then to Dubuque on the Illinois Central Railroad. Eastbound trains were split at Harlem, and one part, in care of the conductor, was run over the St. Charles Air Line into the Illinois Central depot while the balance of train in charge of the baggageman or brakeman, was run over the main line of the Galena Road into its depot at Wells Street.

Courtesy of F. A. Cole

G. & C. U.—First Railroad Station in Chicago—1848. Site: West of Canal and South of Kinzie St.
G. & C. U.—Built 1852-3.

Courtesy of F. A. Cole

G. & C. U.—Built 1852-3
Site: North side of Chicago River and west side of Wells St.

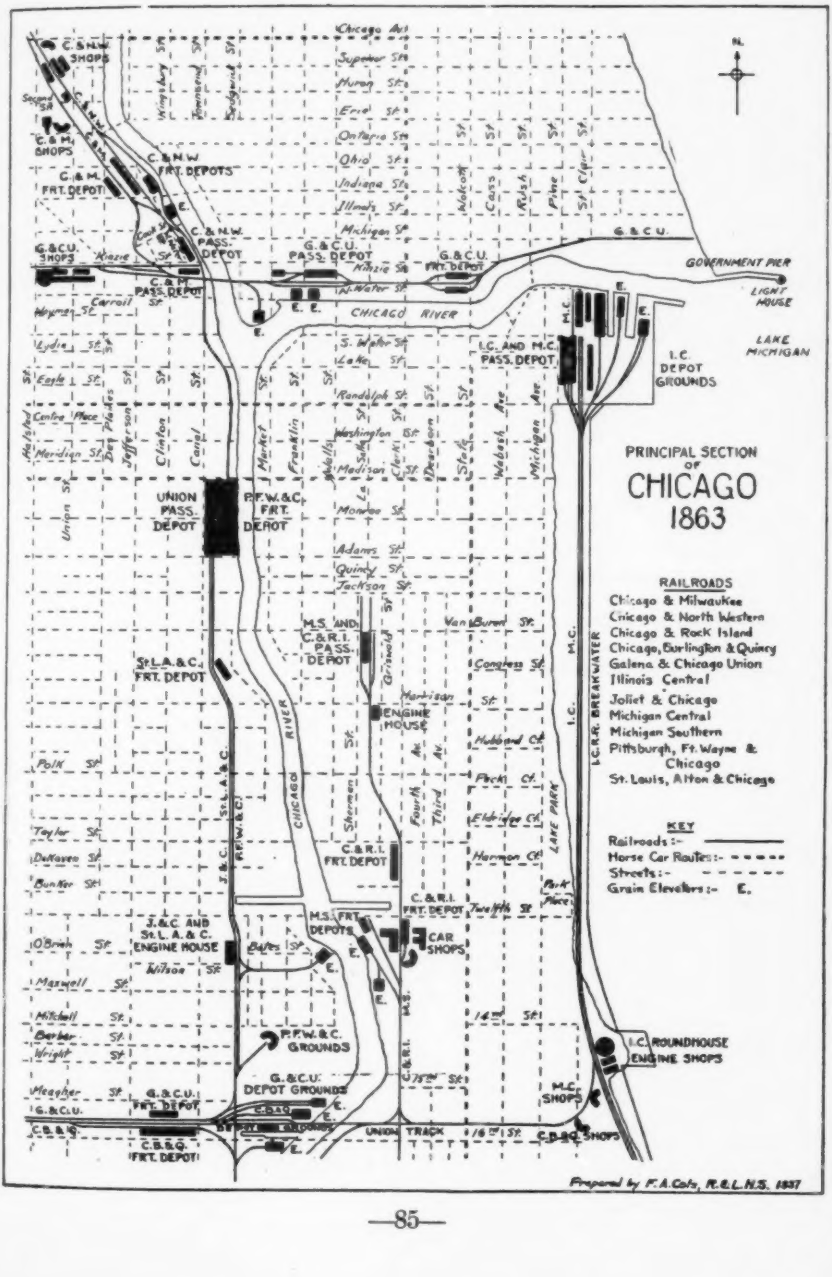


Courtesy of F. A. Cole

G. & C. U. Second Station with third story added. Destroyed by Chicago Fire—1871.

Courtesy of F. A. Cole

C. & N. W.—Wells St. Station—built 1880-82 on Site of Second G. & C. U. Station.


PRINCIPAL SECTION OF CHICAGO 1863
RAILROADS
Chicago & Milwaukee
Chicago & North Western
Chicago & Rock Island
Chicago, Burlington & Quincy
Galena & Chicago Union
Illinois Central
Joliet & Chicago
Michigan Central
Michigan Southern
Pittsburgh, Ft. Wayne & Chicago
St. Louis, Alton & Chicago
KEY
Railroads :-
Horse Car Routes :-
Streets :-
Grain Elevators :- E.
N.
C. & N.W. SHOPS
C. & M. SHOPS
C. & M. FRT. DEPOT
C. & N.W. FRT. DEPOTS
C. & N.W. PASS. DEPOT
G. & C.U. SHOPS
C. & M. PASS. DEPOT
G. & C.U. PASS. DEPOT
G. & C.U. FRT. DEPOT
G. & C.U.
GOVERNMENT PIER
LIGHT HOUSE
LAKE MICHIGAN
CHICAGO RIVER
I.C. AND M.C. PASS. DEPOT
I.C. DEPOT GROUNDS
UNION PASS. DEPOT
P.F.W. & C. FRT. DEPOT
M.S. AND C. & R.I. PASS. DEPOT
ENGINE HOUSE
St. L. A. & C. FRT. DEPOT
C. & R.I. FRT. DEPOT
M.S. FRT. DEPOTS
CAR SHOPS
J. & C. AND St. L. A. & C. ENGINE HOUSE
P.F.W. & C. GROUNDS
G. & C.U. DEPOT GROUNDS
G. & C.U. FRT. DEPOT
C.B. & Q. FRT. DEPOT
UNION TRACK
I.C. ROUNDHOUSE ENGINE SHOPS
M.C. SHOPS
C.B. & Q. SHOPS
LAKE PARK
I.C.R.R. BREAKWATER
Chicago Av.
Superior St.
Huron St.
Erie St.
Ontario St.
Ohio St.
Indiana St.
Illinois St.
Michigan St.
Kinzie St.
N. Water St.
S. Water St.
Lake St.
Randolph St.
Washington St.
Madison St.
Monroe St.
Adams St.
Quincy St.
Jackson St.
Van Buren St.
Congress St.
Harrison St.
Hubbard Ct.
Peck Ct.
Eldridge Ct.
Harmon Ct.
Twelfth St.
14th St.
15th St.
16th St.
Halsted St.
Des Plaines St.
Jefferson St.
Clinton St.
Canal St.
Union St.
Market St.
Franklin St.
Wells St.
La Salle St.
Clark St.
Dearborn St.
State St.
Wabash Ave.
Michigan Ave.
Sherman St.
Griswold St.
Fourth Av.
Third Av.
Wolcott St.
Cass St.
Rush St.
Pine St.
St. Clair St.
Kingsbury St.
Townsend St.
Sedgwick St.
Polk St.
Taylor St.
DeKoven St.
Bunker St.
O'Brien St.
Maxwell St.
Mitchell St.
Barber St.
Wright St.
Meagher St.
Wilson St.
Bates St.
Prepared by F. A. Cole, R. & L. H. S. 1937

It may also be of interest to state here that for years the trains of what is now the Chicago, Burlington and Quincy Railroad ran over the Galena Road from Turner Junction, now West Chicago, to the Wells Street Station. Also, room was furnished in the same station for the Chicago and Great Eastern Railroad Company, which became a part of the Pittsburgh, Cincinnati, Chicago and St. Louis Railway, now a part of the Pennsylvania Railway System.

In 1907 the President's Annual Report stated:

> "To provide much needed facilities in the city of Chicago for the accommodation of the growing passenger traffic of the Company, and to avoid the serious delays and interruptions to that traffic now incident to the crossing of the north branch of the Chicago river, where the requirements of navigation are large and important, the board of directors, after careful consideration of the possible expansion and adaptability of the present terminal, have authorized the construction of an entirely new passenger terminal in another location. The plans contemplate a terminal having sixteen tracks elevated above the plane of the streets, and located on the three blocks of land bounded by Lake Street on the north, Madison Street on the South, Canal Street on the east, and Clinton Street on the west, with two (four track) elevated approaches, one from the west and one from the north."

Studies for this terminal which is shown by solid lines in figure 1 were started in 1905. Its cost was approximately $24,000,000. of which about $6,000,000. was for the Station Building and Train Shed. Time will not permit a detailed description of the construction. Such a description was presented before the Western Society of Engineers, September 6, 1911, by the late Mr. W. C. Armstrong, M.W.S.E. Engineer in Charge of the construction of this terminal. However, it may be interesting to mention a few of the quantities involved:

Piles Driven 43,000 or	1,530,000 lin. ft.
Excavation	250,000 cu. yds.
Concrete	265,000 cu. yds.
Structural Steel	37,000 Tons
Waterproofing	665,000 sq. ft.
Tracks	18 miles
Foundation Caissons	216

93 of the 172 caissons under the station building and 4 under the power house chimney extended 120 feet below street level to rock. The others were founded on hardpan about 85 feet below street level. In sinking the caissons to rock an underground stream or lake filled with boulders was encountered at a depth of about 100 ft. under the south west portion of the building. Pumping out of water was considered inadvisable because of possible subsidence of adjacent land and consequent damage to buildings. Therefore, compressed air chambers were used in excavating the last 20 ft. It is believed these were the first building caissons in Chicago built in this manner.

The first passenger train departed from the new station June 4, 1911.

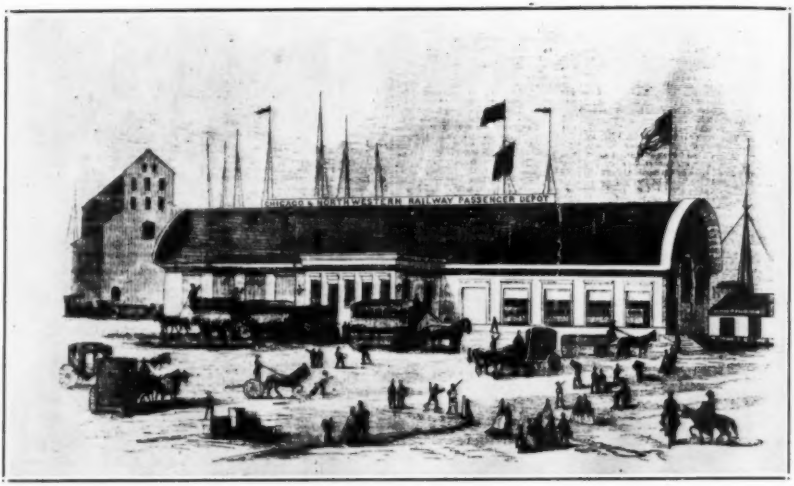
Figure 8 is the main entrance from Madison Street.

Courtesy of F. A. Cole

C. & N.-W.—Wells St. Station, showing "The Annex." Remained in service until 1911.

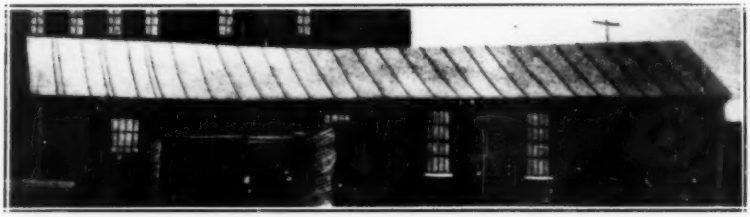
Courtesy of F. A. Cole

C. & N.-W.—Wells St. Station, tracks and trainshed—1909.



C. St. P. & F. duL. Kinzie St. Depot—1856.
This road became the C. & N.-W. in 1859.

Courtesy of F. A. Cole



Chicago & Milwaukee R. R. Passenger Depot.
Site: Halstead, north of Erie St. Built in 1854,
Shown used as a Lumber Shed.

Courtesy of F. A. Cole

Figure 9 is an interior view of the first floor level. On this floor are ticket office, baggage check-rooms, barber shop, air-cooled restaurant, stores and cab stands.

In the basement is an air-cooled cafeteria.

Figure 10 is the main waiting room on the second floor which is also the station track level. On this floor are: An air-cooled restaurant, women's rest rooms, men's room, telephones and news and refreshment stands.

On the third floor are an emergency hospital, women's tea rooms, baths and other facilities for making one beautiful.

There are also terminal, division and Pullman Company offices in this building.

For the convenience of the public a foot bridge was constructed about seven years ago connecting this building with the Daily News Building, thus greatly reducing the congestion and hazard of pedestrians crossing Madison and Canal Streets. 34,795 people were counted crossing this bridge in one twenty-four hour period, midday to midday.

Figure 11 is the concourse through which passengers pass to and from trains. This concourse is particularly popular and well crowded during snow storms when other transportation facilities fail.

There is another entrance and exit to the train level floor from a street level concourse between Washington and Randolph Streets in which are restaurant, news and cigar stands and barber shop. It is particularly convenient for those whose offices are in the north part of the business district.

Figure 12 shows the train shed.

This station is the only one in Chicago serving but one railroad, 133 trains arrive at and 134 trains depart from it daily, and during September 1936, 1,318,758 passengers arrived at and departed from the station.

I submit that there was a decided improvement in our stations during the 63 year period, 1848 figure 2 to 1911 figure 13 and after 25 years we are still proud of our present station.

Brief Sojourns

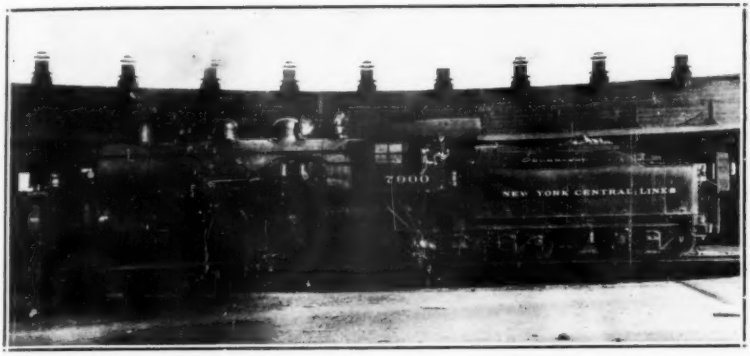
By Ann Arbor

IN ONE of my previous contributions I have made reference to the service between Detroit and Toledo and were it not for a request from one of our members forwarded to me by your Editor, nothing further would be said on the subject. However, first I want to correct a wrong impression that might have been gathered from my contribution in Bulletin #41. One of our members had the kindness to write me that the Atlantic type of locomotive was continued for many years on the Peoria & Eastern long after the first lot of these engines were assigned elsewhere. That is true and it was not my intention to convey the impression that they were never used there after the first lot had been tried. I mentioned these engines only because I had seen them on occasional visits to Toledo and also because I felt the "roundhouse story" was too good to keep. Having corrected this impression we will proceed with the subject at hand.

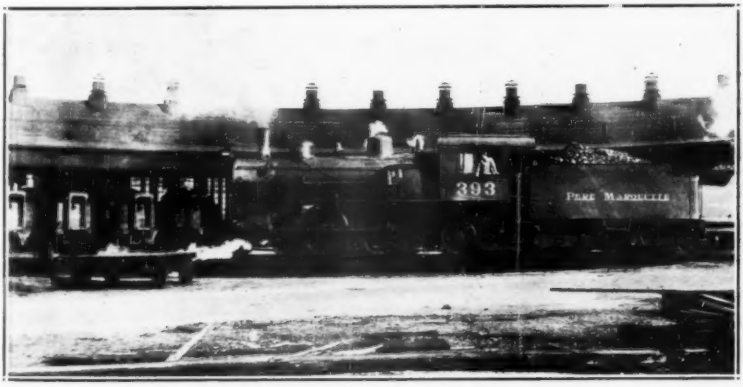
Toledo, once included in the State of Michigan, was ceded to the State of Ohio in exchange for the Upper Peninsular. With the discovery of the rich mines in that section, the "Michiganders" seemed to have gained the best of the bargain. Detroit has since risen to front rank in the automotive industry and Toledo is a large manufacturing centre. At the time I have in mind Detroit was growing in size and the Hotel Cadillac served a wonderful dinner for $1.00. Toledo was growing but had not developed into the Lake Port and manufacturing that it is now. Located about sixty miles apart, these two cities created much traffic and the railroad lines were of interest.

These cities were served by the Michigan Central and the Lake Shore & Michigan Southern, both under New York Central control; the Pere Marquette, the Detroit & Toledo Shore Line and the Detroit United, the latter an interurban road. The service, to quote a fellow passenger was —"Morning, noon and night and nothing to brag of!" Perhaps so but he might have been a pessimist!

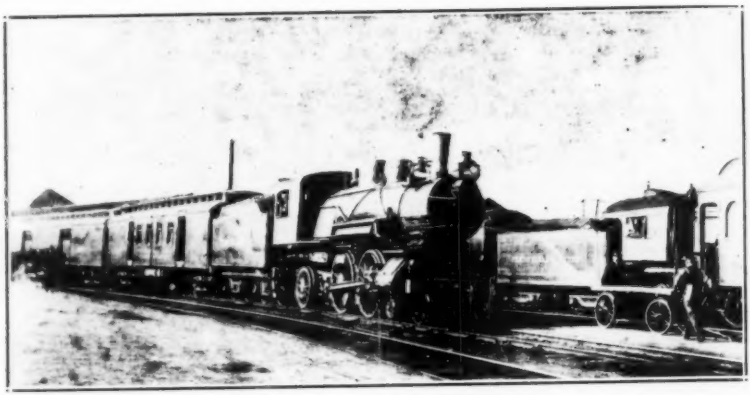
The Lake Shore trains left Detroit from the old Fort St. Station. Their trains ran through to Cleveland or Pittsburgh and in 1914 they operated four trains each way daily. The first left Detroit at 7:00 A. M. and was followed by trains at 2:45 and 5:00 P. M. and the 11:00 P. M. with the sleepers. The Michigan Central operated out of their own station and their trains operated to Cincinnati in connection with the "Big Four" and they also carried through equipment of the Pennsylvania Lines on certain trains. Their hours of departure were 8:10 and 11:55 A. M., 8:20 and 10:20 P. M. The Pere Marquette operated out of Fort St. Station in connection with the C. H. & D. for Cincinnati. Their trains left at 8:20 A. M., Noon and 10:45 P. M. All of these were through trains, operating beyond Toledo and all stopped at Monroe, Mich. and the Wagon Works in Toledo. The Detroit & Toledo Shore Line was for freight only. However, adequate service between the two cities was given by the Detroit United with a limited every two hours stopping only at Monroe; an express every two hours stopping at the principal towns



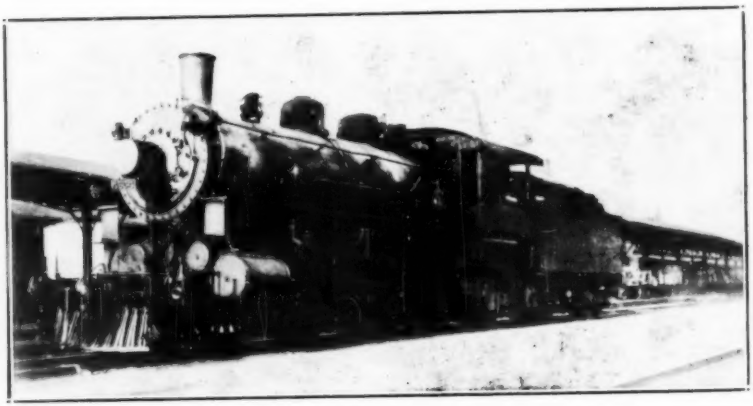
M. C. #7900 at Toledo. I-80c. Schenectady, 1903.



P. M. #393 at Toledo. A-4. Brooks, 1902.



P. M. #391 arriving at Toledo from Detroit. The "Big Four" train for Cincinnati has just left, note the last car and the Penna Lines train for Pittsburgh is about to leave.



L. S. & M. S. 4654 at Toledo. J-40f. Brooks, 1901.

and a local every two hours that would stop anywhere. The schedule was arranged so that there was not an hour during the daytime but that the sojourner could take an interurban fo. either city. The running time of the limiteds was two hours and they easily made it. Later these limiteds were run through to Cleveland in connection with the Lake Shore Electric Ry.

Of the three steam roads, the Lake Shore had the longer route—65 miles and their fastest train was the 7:00 A. M. out of Detroit that made the running time to Toledo in one hour and 45 minutes. The distance via the Pere Marquette was 64 miles and their fastest train was the 8:20 A. M. from Detroit, running time one hour and 50 minutes. The Michigan Central was the shorter route, the distance only 59 miles and their fastest trains were the 11:55 A. M. from Detroit and the 3:03 P. M. from Toledo, running time was one hour and 43 minutes and one hour and 42 minutes respectively. In no sense of the word could this be called fast and it was not even in keeping with other portions of the respective roads. The motive power used on the M. C. and Pere Marquette was the Atlantic type while the Lake Shore trains were handled by the Prairie type. With the exception of the night trains, the majority of these trains were not over five cars on any road.

Although the Lake Shore and the Michigan Central were controlled by the New York Central, each road was operated separately viz. two single track roads. Only in case of an emergency such as a wreck were trains of either road detoured over the other. In more recent times, with the old Lake Shore trains using the new Michigan Central station in Detroit have both roads been operated as one double tracked line. It should have been done long before it actually was accomplished. This would have allowed a speeding up of trains had the management so desired. The schedules were staggered so as to provide service throughout the day on either road and this provided no difficulty at Toledo where trains of both routes left from the same station. The problem was a bit more difficult at Detroit where different stations were used.

On the whole the ride on the train was quite worth while. The passenger fare was 2c per mile and Mr. Pullman would let you ride in one of his chair cars for 25c additional. The tracks of the Lake Shore, Michigan Central and Detroit & Toledo Shore Line were not far apart in several places and it was not uncommon to pass a passenger train on the other road or over take one of the freight trains on the latter. A race between two passenger trains, one of them a bit delayed was quite worth while and you often wondered if the other arrived first at Detroit.

Well, the eastbound "Mercury" makes the distance in one hour flat now and other trains have been speeded up which augurs well for changing conditions. Steel cars have replaced those of wood with their colored glass over the windows. The horrible screech of a whistle has given way to the standard chime whistle and the road bed greatly improved. But I repeat, the service between Detroit and Toledo was interesting in the past and it is safe to assume that it will be in the years to come.

Worth Reading

(Compiled by ELIZABETH O. CULLEN, *Reference Librarian, Bureau of Railway Economics, Association of American Railroads, Washington, D. C.)*

BOOKS AND PAMPHLETS

From Dog Sleds to Air-Conditioned Trains—A Pictorial History of the Canadian Pacific Railway. 16 pp. Illustrations. Montreal, Canada, The Canadian Pacific Ry. Co. While the Insert states: "This little book has been printed especially for the many children who travel on the Canadian Pacific . . . ," grown-ups find this book a helpful short-cut through Canadian history.

How Fast Is Too Slow? by L. K. Sillcox. 17 pp. Illustrated. New York, The Author. His address before Washington, D. C. Section, American Society of Mechanical Engineers. Reprinted in Mechanical Engineering, July 1937, pp. 511-516. "High speed and safety" p. 1; "The Ideal right-of-way" p. 3; "Suitability of the conventional locomotive" p. 6; "Advantages of electric traction" pp. 6-7; "Unique versus conventional locomotive design" p. 8; "Air resistance and streamlining" pp. 14-16.

Let Me Show You Vermont, by Charles Edward Crane, with an introduction by Dorothy Canfield Fisher. 374 pp. Index. Illustrations. Maps. New York, London, Alfred A. Knopf. "Wings and Rails" pp. 308-316, includes "It was less than a century ago that travel in Vermont by rail was as novel as it may be to some today by plane . . . " p. 314.

The Model Railroader Cyclopedia 1937—*Railroad Prototype Equipment Plans.* 79 pp. Illustrations. 19 plates. Wauwatosa, Wisconsin, The Modelmaker Corporation.

The Pennsylvania Railroad Company—History of the Floods of March, 1936 *and January*, 1937, compiled by Chas. W. Garrett. 150 pp. Illustrations. Maps. " . . . It is not the purpose of this report to give in detail what occurred at each particular point, but to put in permanent form a general account of what transpired from the viewpoint of the system as a whole . . . " Foreword, p. 8.

Railroad West—A Novel, by Cornelia Meigs, with illustrations by Helen Hunt Bencker. 326 pp. Boston, Little, Brown & Co. " . . . The engineering history [of the Northern Pacific Ry.] in this account is taken from the record of an eye witness. Certain conspicuously recognizable figures are mentioned by name, Jay Cooke, Colonel Custer, Bishop Whipple, etc. The other characters are imaginary." Insert leaf.

The Railway Interrelations of the United States and Canada, by William J. Wilgus. 304 pp. Maps. New Haven, Conn., Yale University Press. One of a series prepared under the direction of Division of Economics and History, Carnegie Endowment for International Peace, James T. Shotwell, director, who writes in the Foreword, p. v: "The subject of this volume is unique. The story which it tells has no parallel

in history . . . The narrative of this development is, therefore, something more than a chapter of the history of railroading or of the economic history of the two countries concerned. It is also the analysis of a great experience in international relations which has example as well as precept to offer to the rest of the world . . . " Chapter II, *Historical Outline*, discusses transportation from 1535 to 1935; Chapter III, *Northeastern Gateways*, pp. 48-75, includes "First cross-border rail communication" pp. 49-52; Chapters IV and V, Great Lakes Gateways, pp. 76-121; Chapter VI, *Northwestern Gateways*, pp. 122-144; Chapter VII, *Interrelated Mileages and Border Activities*, pp. 145-158; Chapter VIII, *Border Structures of Magnitude*, pp. 159-175, describes Niagara Gorge Upper and Lower Bridges, Victoria Bridge, International Bridge at Black Rock, Sault Ste. Marie Bridge, Sarnia Tunnel, Cornwall Bridge, Detroit River Tunnel, and Van Buren Bridge.

The United States Army in War and Peace, by Oliver L. Spaulding, Colonel, U. S. Army. 541 pp. Frontis. Maps. New York, G. P. Putnam's Sons. Pointing out, on p. 1, that "the United States Army antedates the United States," Col. Spaulding provides in this book, an unusual and interesting contribution to transportation history from colonial days to the present. Chapter VIII, *The Thirty Years' Peace*, pp. 147-172, covers the period 1815-1845; Chapter XI, *The New Frontier*, pp. 227-242, covers the period 1849-1860, which includes the experiments with camels in the Southwest and the Pacific Railroad surveys, and Chapter XVIII, *The West*, pp. 342-368, includes the construction period of the Union Pacific.

Universal Directory of Railway Officials and Railway Year Book 1937-1938, compiled from official sources under the direction of The Editor of *The Railway Gazette*. 604 pp. London, England, The Directory Publishing Company, Limited. Under each of the large railways there is a brief historical sketch of the railway, and brief historical sketches for each of the official bodies like Ministries of Transport in various countries, Interstate Commerce Commission, etc. "Statistical and Other Information" pp. 392-506, includes titles of chief railway officers in 4 languages—English, French, German, Spanish—, principal gauges and "chief places where used"; Development of World's Railway Mileage 1840-1937; greatest altitudes, world's longest railway tunnels, and fastest scheduled runs in summer 1936.

PERIODICAL ARTICLES

The Century's Great Inventions, by D. S. Kimball. Illustrated. See list under "Transportation" in Table I, p. 507. Mechanical Engineering, July 1937, pp. 507-510.

Freight Traffic Through Chicago & Northwestern Ry. Station Makes Proviso Yard of C. & N. W. A World Crossroads. Illustrations and plan drawing of track layout and buildings. *D and W*, August 1937, pp. 12-16.

Isaac Dodds: Pioneer Railway Engineer—An Inventor to whose Genius Is Due Much of the Scientific Advancement of Railways. Born 1801. Died 1882. " . . . Dodds was one of the earliest advocates of steel

rails, stoutly maintaining their superiority over iron in face of the pronounced prejudice of contemporary engineers . . . " *Railway Gazette*, August 6, 1937, p. 232.

Model Railroaders. Illustration with caption: Model Railroader Kalmbach—There are 6,000 More Like Him. *Time*, September 3, 1937, p. 24.

The Railroad on the San Francisco Bay Bridge, by Alfred J. Lundberg, Clinton A. Veale, E. W. Stone, and R. E. Fisher. Pacific Railway Club Proceedings, May 1937, pp. 4-15, with discussion pp. 15-19.

Steampower Forges Ahead, by Frederick J. Prior. Illustrated. *Locomotive Engineers Journal*, May 1937, pp. 331-335.

A Study of Diesel-Electric Motive Power on Railroads—Report, by Committee on Transportation, Maine Association of Railroads. Illustrated. "The Diesel-electric switcher" pp. 424-425; "Diesel-electric locomotives in transfer service" p. 425; "Diesel-electric rail cars" pp. 425-426; "The light-weight streamlined passenger train" pp. 426-427; "The Diesel-electric power unit as a road engine" pp. 427-428.

Terminologie Employée dans le Service de l'Exploitation, by Dr. Lehmann. A helpful contribution to railroad conversations and translations in French. Bulletin des C.F.F. [Berne, Switzerland], August 1937, pp. 120-122.

U. S. S. R. Railway and Highway Transport 1932-1937. Map. *Foreign Railway News*, U. S. Department of Commerce, Special Issue dated July 24, 1937. 18 pp. Note attached states that this issue will serve as Supplement No. 40 to the Department's World Survey of Foreign Railways.

A Week That Has Made Railway History. "Three events of the past few days are of sufficient importance to justify being considered . . . as chapters in railway history. These are, of course, the judgment of the Railway Rates Tribunal . . . ; the decision of the Rail Staff Tribunal . . . ; and the proposals in France to form one large national railway company under State control . . . " *Railway Gazette*, August 13, 1937, p. 269.

What's On Your Mind? by G. E. Gaylord and John H. Coupin. Mr. Gaylord is Superintendent, Southern Pacific, and discussed operation of a Division. Mr. Coupin is General Agent, Western Pacific, and discussed relations of the Traffic Department with other departments of a railroad organization. Pacific Railway Club Proceedings, April 1937, pp. 6-20, with discussion pp. 20-23.

Federal Documents Relating to Railroads—Some Highlights

Talk by ELIZABETH O. CULLEN, *Reference Librarian, Bureau of Railway Economics Library, Association of American Railroads, at meeting of Library Science Club, The George Washington University, Washington, D. C., Sunday, December 13, 1936.*

WHEN Miss Bredekamp called up the other day to ask that a talk on federal documents relating to transportation be given to this Club, Mr. Johnson, the Librarian and I held a conference, and agreed that what I could do in the time allotted for the talk was to survey the High-lights of federal documents relating to railroad transportation.

In our Library there are 8 Library Bureau card drawers of cards for federal documents relating to railroad transportation, whether arranged by dates of publication, or by authors. No estimate of the number of cards for documents relating to other forms of transportation—highways, waterways, airways, pipelines, and others—is available. Railroad documents range over the last 126 years. It was not possible to prepare a list of them to bring with me to this meeting, but when we do prepare the list, we shall be glad to send copies to the Club.

The first federal document mentioning railroads was published in 1808. It is Report of the Secretary of the Treasury on the subject of public roads and canals, and was printed by order of the Senate on April 12, 1808, by R. C. Weightman, here. A second edition was printed in 1808, by William Duane in Philadelphia. It is generally known as the *Gallatin Report*, because Albert Gallatin was secretary of the Treasury at the time.

The United States at that time of course had a transportation problem. It has always had one, and whether one is concerned with highlights or details of that problem, it is well to have convenient for reference, maps of the various periods. The Atlas published by the Carnegie Institution here and the American Geographical Society in New York, jointly in 1932, containing maps of the United States at the different periods in our history, is a good thing to have at hand, in any study of transportation that ranges over 100 years.

I brought along my copy of the *Gallatin Report* so that I could read brief extracts from Benjamin H. Latrobe's posteript, dated April 1, 1808, beginning on page 104:

". . . It has however occurred to me, that a few remarks upon rail roads might not be unacceptable to you, especially as the public attention has been often called to this sort of improvement, and the public mind filled with very imperfect conceptions of its utility.

"Rail roads may be constructed of iron or of timber. The most durable (but also the most expensive) rail roads, consist of cast iron *rails* let down on stone foundations; such roads will last for ages. Cast iron rails secured on beds of timber, are sufficiently durable for our country, and of moderate expense. Rail roads entirely of timber, are fit only for temporary purposes.

"A rail road consists of two pair of parallel ways, one pair for going, the other for returning carriages; single roads with occasional passing places, are applicable to some situations, and are of course less expensive. I will concisely describe the road best adapted to the objects that in our country can be attained by it:— . . . .

which he did as you will see as the copy goes around, estimating that the total cost per mile for a two-track railway would be $10,000, following it with a brief account of the

"carriages which travel on these roads . . ."

and went on,

". . . The astonishing loads drawn upon rail roads by single horses in England, have induced many of our citizens to hope for their early application to the use of our country. I fear this hope is vain, excepting on a very small scale, and that chiefly in the coal country near Richmond. For it is evident that upon a rail road no other carriage but that which is expressly constructed for the purpose, can be employed,—and that to render a rail road sufficiently saving of the expense of common carriage, to justify the cost of its erection, there must be a very great demand for its use. But the sort of produce which is carried to our markets is collected from such scattered points, and comes by such a diversity of routes, that rail roads are out of the question as to the carriage of common articles . . ."

Latrobe was not only an outstanding engineer and architect in his time, but because his services and advice was wanted all over the United States of his day, he was one of the most experienced travelers. A glance at his travels outlined in Fiske Kimball's biography of Latrobe in the Dictionary of American Biography makes one realize that there were few sections into which he had not been. When he wrote the postcript in 1808, his namesake son was two years old. When the son grew up he entered railroad construction on the Baltimore and Ohio and was in charge of the extension of the line west of Wheeling, and another son was connected with the legal department of the Baltimore and Ohio. While the father did not think railroads practicable for the uses of this country because "the sort of produce which is carried to our markets is collected from such scattered points, and comes by such a diversity of routes, that rail roads are out of the question as to the carriage of common articles," his sons helped make it possible for the extension of lines to reach sections and commodities that few in 1808 realized could be handled. As for 1936, you'll see in the pictures some of the 1,800,000 freight cars that carry both common and uncommon articles.

In 1816 the Gallatin report was reprinted by order of the Senate. This reprint was reprinted in 1817 in A Treatise on International Navigation published at Ballston Spa. In 1818 it was partly reprinted. It is also to be found in American State Papers, Miscellaneous series, v. 1, no. 250.

In 1832, the House of Representatives had reprinted the Report on Steam carriages by a select committee of the House of Commons of Great Britain. This is 22d Cong., 1st sess. House Doc. No. 101. To the House of Commons report was appended by order of the Committee on internal improvements of the House of Representatives, Documents in relation to the comparative merits of canals and railroads, submitted by Mr. Howard of Maryland, which are to be found on pages 147-386.

Jonathan Knight, chief engineer of the Baltimore & Ohio, submitted a report to Philip E. Thomas, president of the railroad, dated Baltimore, March 5, 1832, which is printed among the *Documents* and includes:

". . . We shall begin with the following comparison of canals, railways and turnpike roads, with regard to the effects of the moving power upon them . . . "

"Moving power" in 1832 consisted of horses or mules or locomotives coming into general use on railroads, and Knight went into practical details of 1832 that make interesting reading in 1937, as my brief quotations indicate:

". . . Now, the proper constant working energy of a horse, (and it is the same with mechanical agents, of all kinds, including the steam engine) is one half of his capable energy . . . Consequently, the horses employed upon the Cumberland road, are capable of a constant draught, during 8 hours each day, of 150 lbs. And this happens to be the same as the horse power established by engineers as the unit of measure in reckoning the power of the steam engine.

"The time these horses employ in performing the trip from Baltimore to Wheeling, 266 miles, over this hilly road, is usually 15 days, averaging 18 miles per day; and they could, with equal, if not greater ease, travel 20 miles per day, on a railroad, with the same draught . . . Moreover, upon the railway, he would be entirely relieved from *holding back*, for, in the case of gravity upon a descending part of the *way* should exceed the friction, the conductor of the train would apply the *brake*, and effectively regulate the motion of the cars; and, we may remark, by the way, that, upon a canal, the draught is necessarily almost a constant tug, and does not admit of relaxation without coming to a pause, when there is a loss of time; added to this, the animal has to draw at the end of a long elastic rope and parallel to the direction of the motion, thereby suffering a partial distress, together with a loss of effective power in the ratio of the co-sine to the sine of the deviating angle.

"We see reasons, therefore, for the conclusion that, in general, the horse will work and thrive better in operating upon a railway than in tugging upon the tow path of a canal . . . "

As for mules, he quoted figures from reports of the Mauch Chunk Railway for 1828 and 1829, which showed reductions in costs of mules and drivers, where

"Forty-two wagons laden with 67 tons of coal, and 7 wagons carrying 28 mules, descend by their gravity, conducted by 4 men, who, with the brakes, regulate the speed; otherwise, the distance being 8 miles, and the rate of descent 1 in 55, the velocity would become ruinously great. The descent having been performed in about 1¼ hours, the four drivers return through the 8 miles up the ascent of 1 in 55, with the 49 wagons; that is, 21 mules draw 42 empty coal wagons, and the remaining 7 mules with the 7 mule wagons. In order that this round shall be repeated in the day, so as to transport 134 tons of coal daily, the ascent has to be performed at the rate of about 4 miles per hour, for two hours; so that the two entire trips over a distance of 32 miles, are performed, as the day's work should be, in 8 hours; making allowance for detentions at each end of the road, and at the half-way station, where, it being a single railway, the trains have to pass each other . . . "

In his report dated Baltimore, February 17th, 1832, on the

"calculations and estimates of the probable amount of expense that will be required in the construction of the contemplated railroad to connect the cities of Washington and Baltimore"

Knight pointed out

"that the velocities to be employed upon this road would be as high as confidence and safety would permit, and that a speed of about twenty miles per hour must be attained, so as to perform the trip from city to city within *two hours*. This will probably require the use of a locomotive engine, weighing six tons, to convey a train of six cars, containing one hundred passengers in the time proposed . . . "

A lot has happened in motive power and trains between Baltimore and Washington since 1832, and you may like to remember Knight next time you travel and observe the 1937 motive power and trains.

In 1835 the secretary of War, "in compliance with a resolution of the House of Representatives," transmitted a report on railroads' routes from the Atlantic to the Mississippi. This is 23d Cong., 2d sess. House Doc. No. 177, War Dept. and the officer who made it was Lieut-Col, Stephen Harriman Long. He reported reconnaissances for railroads from Augusta, Ga. to Memphis, Tenn., from Memphis to the eastern base of Cumberland mountain, East Tenn., and from Memphis to Savannah, Ga. It is dated Philadelphia, Feb. 10, 1835. Long was an outstanding engineer of his period, and tracing his journeys requires frequent references to the Atlas of maps. Next time you are out in the Rockies, look at Long's Peak, which he explored. Western explorations had gone many miles westward than the "west" referred to in Gallatin's report.

In 1836, another section was placed on record. The secretary of War reported on a survey of a railroad from Pensacola, Fla. to Columbus, Ga. This is 24th Cong., 1st sess. House Doc. 186.

Two years later, in 1838, in obedience to a House resolution, the secretary of the Treasury transmitted a report on steam engines. This is 25th Cong., 3d sess. House doc. no. 21, Treasury dept. Steam engines in boats, in industrial plants, and locomotive steam engines by owners, types, names of makers, and names of engines were reported in detail by the collectors of customs who surveyed their respective territories.

The next year, 1839, 26th, Cong. 1st sess. House doc. no. 18, Treas. dept. appeared. The title is *Railroad Iron Imported*, and it tabulates a seven-year survey of "quantity and description of iron, whether for railroads, steamboats, or for other purposes, which has been imported free of duty, or on which the duty has been remitted, since the first day of January, 1832, to June 30, 1839; together with the amount of duties which would have accrued to the Government had the duties been regularly charged thereon . . ."

Our Pittsburgh and Birmingham were still in the future when that report was made. Iron of every description had to be imported and remissions of duties resolutions in quantities pervade the documents from the 1830s to the 1850s.

Even so, railroads had not been quite *accepted* by some of the persons in the country. The same year the railroad iron report appeared, 1839, a striking poster protesting against railroads for specific reasons, appeared all over Philadelphia. The reasons were many—you can read them in the reprint of the poster in Locomotive Engineers Journal, October 1936, p. 767. The Journal's caption is "It looks funny now."

Land grant memorials had become frequent. Three which summarize the wishes of various communities were printed as 26th Cong. 1st sess. House report 322, which is a *Memorial of southern railroads*, dated April 4, 1840; Senate Doc. no. 459, which is Illinois citizens *Memorial on a railroad from the Atlantic to the Mississippi*, dated May 13, 1840, and House doc. no. 213, which is Boston citizens' *Memorial on a railroad from Boston to the Mississippi*, May 18, 1840.

In 1841, the Wisconsin Legislature's *Memorial for a railroad from Lake Michigan to the Mississippi River*, Jan. 5, 1841, was printed as 26th Cong., 2nd sess. Senate Doc. no. 165.

The next year, *Documents showing the public value of railways*, by I. Delafield and Edwin F. Johnson, was printed as 27th Cong., 2d sess. Senate Doc. 327. Importance of railroads in defense of country, and the necessity for speed and cheap transportation in a country the size of the United States were emphasized. The "documents" are dated April 9 and 17, 1842.

In 1845, Asa Whitney presented his first memorial regarding a national railroad connecting Atlantic & Pacific oceans, to the House on Jan. 28, 1845. This was printed as 28th Cong., 2d sess. House doc. no. 72, and from that time on the documents are full of subsequent memorials, comments on them, and the like. In March 1845, the House committee on roads and canals reported on Whitney's plan. This is 28th Cong., 2d sess. House report no. 199.

In 1846, Robert Mills' *Memorial submitting a new plan of roadway . . .* was published as 29th Cong., 1st sess. House doc. 173. Mills was then the outstanding American architect. At the suggestion of Thomas Jefferson, he studied under Benjamin H. Latrobe, and in 1808 when Latrobe wrote his report on railroads, Mills was a draughtsman in his office. Mills' services as architect and engineer were in increasing demand as time went on and he had ample opportunity to look over the transportation situation as he traveled about. Hence his new plan of roadway attracted more than ordinary attention.

By July 1846, the House Committee on roads and canals not only presented a report recommending a survey for construction of a railroad between the navigation waters of the Missouri and Columbia rivers—this is 29th Cong., 1st sess. House reports no. 773—but accompanied it by a bill H. R. 513, to provide finances for the survey.

Senate Doc. no. 466 of this Congress was a report presented by Senator Sidney Breese, July 31, 1846, on national aid to railroads. It favored grants of land to railroads from the Mississippi River to the Columbia River, and from Lake Michigan to the Pacific Ocean.

1848 is notable for the numbers of resolutions approving Whitney's plan from state legislatures. He had petitioned Congress again on Jan. 17, 1848 for a railroad from Lake Michigan to the Pacific Coast "on the plan proposed to 28th Cong. . . ." This petition is 30th Cong., 1st sess. Senate. Misc. doc. no. 28.

On January 24, 1848, three thousand miles from Washington, occurred the event that influenced developments—social, political, economic, and all the rest of them, from the time news traveled to Washington, and elsewhere. Gold was discovered at Sutter's Fort in California.

The news had not reached Washington, however, when Robert Mills' *Memorial respecting new route to Pacific Ocean*—30th Cong., 1st sess. Senate Misc. doc. no. 51, was published in February 1848, nor later when Senate Report no. 191, on Asa Whitney's *Memorial on the railroad from Lake Michigan to Pacific Ocean* was referred to the Senate Committee on public lands.

In December 1848, Senator Thomas Hart Benton of Missouri, unwittingly, perhaps, provided a presage of transportation development, when he submitted *Papers relating to Panama Railroad,* which were printed as 30th Cong., 2d sess. Senate Misc. Doc. no. 6. Benton has come down in history as the man who rode at a gallop all his life. How much time persons saved in the next few years short-cutting to California via the railroad built across the Isthmus of Panama instead of going around Cape Horn, or rather how many persons were saved time because the railroad was built, is so far an unstudied phase of transportation of the 1840s. It is interesting to have Benton's name connected by federal document with the Panama Railroad.

The year 1849 has a special niche in history—not only of the United States but of the world. Mass movement to California persisted. In Washington, Sam Houston of Texas, then a Senator submitted resolutions regarding a railroad to the Pacific, which are 30th Cong., 2d sess. Misc. doc. no. 12, Jan. 8, 1849.

Jesse Dow's *Memorial regarding Tehuantepec Road*—Senate Misc. doc. No. 56, Feb. 15, 1849, asked for finances to build a plank road across that Isthmus as a temporary route until the railroad should have been constructed.

House Report no. 145, *Communications between Atlantic and Pacific,* is a 679 page document which includes "Historical facts regarding plans for railroads and canals between the Atlantic and Pacific Oceans."

1850 reflects the urge of effort to get railroad transportation between east and west. P. P. F. Degrand and others petitioned Congress for a charter to construct a railroad and establish a line of telegraph from St. Louis—which we all know is on the Mississippi River—to San Francisco. On Jan. 14, 1850 it was referred to the committee on roads and canals, and the very next day, Jan. 15, 1850 it was ordered to be printed, and is 31st Cong., 1st sess. Senate Misc. series no. 28.

House report No. 140, *Report on railroad to the Pacific Ocean,* enlarged on "grand objects of the enterprise," "Importance of commerce" and the several proposed routes, finally approving Asa Whitney's, and reporting a bill to "give effect to the views of the committee." This was March 13, 1850.

In July, the California Legislature was heard from. Its *Resolution on a national railroad,*—31st Cong., 1st sess. House. Misc. doc. no. 51—favored construction of a railroad *from* the Pacific Ocean to the Mississippi River, and *immediate* organization of an efficient engineer corps to make the necessary surveys and explorations. This was on July 23. On December 30, 1850, California Legislature sent another resolution urging the same developments. This is Senate Misc. doc. no. 4.

Meanwhile, in August 1850, House report no. 439, was a report concerning the railroad to the Pacific. In September 1850, Senate report no. 194 was on a memorial of Thomas Allen and others, favoring Whitney's plan. It was submitted by Senator Jesse D. Bright of Indiana.

Thomas Allen was president of the railroad company that actually had tracks down and trains running over them west of the Mississippi, the Pacific Railroad of Missouri. Years later, on April 15, 1875, he

told the University Club of St. Louis, about how his company got the first railway construction and the first locomotive west of the Mississippi, in 1852. He was also president of Railway Association of America, an early railway association for the study of common problems.

In December 1852, appeared the Census Office's Report on the *7th Census of 1850*, by J. G. G. Kennedy. He had sent out special circulars to the railroads of his day to acquire data for the railroad section of this report. There were 10,814 miles of railroads completed and in use; 10,898 miles . . . in the course of construction . . .

Some of the 400,000 miles of track in use at the present time you'll see in the Vocafilm when Mr. Jenkins shows his part of this program. Where they are you can trace on *Railroad Map of the United States*, published by the U. S. Engineer Reproduction Corps. The latest edition is dated October 1935. It comes in 4 sections which when mounted make a wall map 7 feet x 4 feet. It costs 40 cents.

1853 is famous for this highlight. (Show Andrews report) As it goes around this meeting you can look at its lengthy title—which has 83 words in it—and is doubtless a good reason why it has come down in history simply as The Andrews Report of 1853, from the name of the man who travelled around in order to acquire the data for it, Israel DeWolf Andrews. It was printed as 3d Cong., 1st Session. Senate Ex. doc. no. 112, and as House Doc. no. 136, altho the latter has the erroneous session reference, 2d instead of 1st. The "Internal Improvements" section contains detailed data on railroads and canals by states, and of the railroads, Andrews wrote, on p. 277:

> "They will one day become the ordinary highways of transit for property as well as persons. A satisfactory view of the commerce of the country, therefore, necessarily involves a description of them as its future channels . . ."

Some of the 1,800,000 freight cars of various types that are in service to transport property in 1936, you'll see in the Vocafilm, along with pictures of equipment and trains for passenger transportation. *Freight Commodity Statistics* of the Interstate Commerce Commission lists kinds of property transported, while the forecasts of the Shippers Advisory Boards summarize principal commodities transported.

In 1854, the War Dept. transmitted reports of surveys of railroad routes to the Pacific Ocean. This is 33rd Cong., 1st sess. House Ex. doc. no. 46.

In 1855, House Ex. doc. no. 129 of the same Congress was another report on the several Pacific railroad explorations. Jefferson Davis was secretary of war.

From 1853-1856, army engineers, scientists of all sorts, and others qualified in some way or another were out in the territory west of the Mississippi exploring the surveys. From 1855 to 1860, their reports were published under the title: *Reports of explorations and surveys to ascertain the most practical and economical route for a railroad from the Mississippi River to the Pacific Ocean. Made under the direction of the secretary of war.* Vols. 1-11 were printed as 33d Cong., 2d sess. House.

Ex. Doc. No. 91, and Senate Ex. doc. No. 78. Vol. 12, was printed as 36th Cong., 1st sess. House Ex. Doc. No. 56.

If any of you have studied geology under Dr. Bassler, here, you've become acquainted with these reports. Or, for that matter, you've become acquainted with them in any of the scientific courses that outline the spread of scientific knowledge, for the scientists seized on the longed-for opportunity to study fauna, flora, minerals, and everything else of interest to them, in a country hitherto accessible only by the hardest endeavor. Their reports are accompanied by plates and maps, that interior decorators of our time, have discovered particularly valuable in their work. They secure copies whenever they turn up in the second-hand dealers stocks—so be sure any copies offered to you are complete with plates and maps.

In 1856, William Hemphill Jones's report on railroad statistics was included in the report of the secretary of the Treasury on the state of the finances for the year ending June 30, 1856. This was also printed as 34th Cong., 3d sess. House. Ex. Doc. No. 2. Definitions and discussions of railroad details are in it.

From 1861 to 1867, General orders, special orders, reports relating to military railroads, and other war operations involving railroads were published, dated all over the United States. General Herman Haupt kept his and we have it, the volume inscribed with his name written in it. It is generally referred to as "General Haupt's Order Book, Civil War."

"*An act to aid in the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean*" was passed by Congress and approved July 1, 1862. It was also printed as Senate Misc. doc. no. 108, 37th Congress, 2d sess. and reprinted in California's The general railroad law of California, printed in Sacramento, in 1862.

A short-cut to the background of this law is found in a much later document, 61st Cong., 2d sess. Senate Doc. No. 447, ordered printed with illustrations on March 22, 1910. The title is *How We Built the Union Pacific* and the author, General Grenville Mellen Dodge, chief engineer of the U. P. construction, from 1866-1870.

A lot of economic, social and military history is summed up in a sentence on p. 9:

> "Lincoln advocated its (the laws) passage and building (of the railroad) not only as a military necessity, but as a means of holding the Pacific Coast to the Union . . . "

In 1862, you'll recall, the man, who as secretary of war, had directed the reports of explorations and surveys mentioned a few minutes ago, was president of the Confederate States of America, Jefferson Davis. There was a war on, in most of the east and the California problem revolved around inadequate transportation between the east and west, as the phrase "holding the Pacific Coast to the Union" suggests.

On pages 12-13, of this later document, General Sherman's letter dated Headquarters, Military Division of the Mississippi, St. Louis, May 1, 1866, granting Dodge leave of absence from the army to assume the duties of chief engineer of the Union Pacific, is printed.

But to go back to the 1860s. In 1865, the Quartermaster General of the army reported to the Senate committee on finance, regarding settlement of claims of certain land-grant railroads for transportation of troops and government stores. This is 38th Cong., 2d sess. Senate. Misc. doc. no. 37.

In 1866, the secretary of war, in compliance with a House resolution, reported on railroad property in possession of the government. This is 39th Cong., 1st sess. House Ex. doc. no. 155.

In 1867, the reports on southern railroads began, and reports on Union Pacific and other Pacific railroads.

39th Cong. 2d sess. House report no. 34, is the first part of the House Select committee on southern railroads *Report on Affairs of southern railroads*, printed with partial testimony. The final part of the testimony was printed as 40th Cong., 2d sess. House. Report No. 3, ordered printed Dec. 11, 1867.

40th Cong., 2d sess. Senate Ex. doc. no. 10, is a 2-page report on the Union Pacific by the secretary of the Interior. The date is Dec. 12, 1867.

Early in 1868, another report on southern railroads, 40th Cong., 2d sess. House reports, no. 15, recommended that the committee on the judiciary report a bill requiring a strict accountability for all railroads in the late rebel states.

Senate Ex. Doc. no. 26, of the 40th Cong. 2d sess., was the report of the secretary of War, E. M. Stanton, on military transportation, showing comparative rates paid by the United States for transportation of troops and military stores, to the Union Pacific Railroad Co., to the Eastern Division of the Union Pacific and to the Chicago and Northwestern.

House report no. 43, of this congress and this session was another report on the Union Pacific, which included a letter from General Sherman favoring aid to the railroad.

Major-General Sheridan, then commanding the Department of the Missouri, also urged continued aid to the Union Pacific in the extension of its lines, as his letter printed as House Ex. doc. no. 277, 40th Cong., 2d session, demonstrated.

House Ex. doc. no. 331, transmitted a copy of General G. M. Dodge's report to the president of the Union Pacific for the year 1867.

That progress was being made in getting railroads west was emphasized perhaps in a report that appeared in January 1869. The secretary of the Interior transmitted the reports of the several Pacific railroad companies, complying with a resolution of the Senate. These are printed as 40th Cong., 3d sess. Senate Ex. doc. no. 10.

A particular problem was the subject of Senate Ex. doc. no. 7, in which the secretary of War—also in compliance with a Senate resolution—presented a statement in relation to the number of troops employed in connection with Indian hostilities in protecting the Missouri river traffic and Union Pacific Railroad.

May 10, 1869, was the date of the joining of the rails—for the Central Pacific had built eastward and the Union Pacific westward and their rails were joined with appropriate ceremonies at Promontory Point,

Utah, on this date. You'll see something of the ceremonies in the Vocafilm.

In 1870, the Quartermaster's dept. transmitted with accompanying papers, a letter from Brevet-Col. F. J. Crilly, on southern railroads. It was dated June 9, 1870.

In 1874, the Senate Select committee on transportation routes to the seaboard, held hearings and made a report on transportation routes to the seaboard. It consists of 2 vols and maps and is 43d Cong., 1st sess. Senate report No. 307. Since Senator William Windom was chairman of the committee, it has become generally known as the "Windom Report."

In 1875, the report of the Chief of Engineers, U. S. Army appeared with appendix CC—a 246-page report on southern railroads.

From 1876 to 1891, the Bureau of statistics of the Treasury department issued reports on the internal commerce of the United States that include detailed data on railroads, that are great helps in research. These are generally known as the Nimmo and Switzler reports, because Joseph Nimmo and Wm. Switzler were chiefs of the bureau when they were made.

From 1878 to 1903, first the Auditor of Railroad Accounts, and then, as the officer was later known, the Commissioner of Railroads, reported each year to the secretary of the Interior on accounts of the land-grant railroads. There are 25 volumes of these reports.

In 1878, the War dept. issued *Reports of inspection made in the summer of 1877* by Generals P. H. Sheridan and W. T. Sherman of country north of the Union Pacific railroad.

June 26, 1876 was the date of Little Big Horn. Following the discovery of Custer and his men, the army intensified its efforts to have the transportation in the western area improved, and to Generals Sheridan and Sherman in this report and elsewhere, for that matter, this meant railroad extension regardless of financial and other problems that had hindered.

In 1880, the Quartermaster-general included in his report for that year, data on cost of transporting troops and supplies over the Northern Pacific railroad during the fiscal year ended June 30, 1877, compared with costs of transportation in same territory before the railroad was built. The Railway World, in its issue of May 22, 1880, page 492, published these comparative costs.

The Census Office in 1880 issued as vol. 4 of the 10th Census, a report on agencies of transportation in the United States, including statistics of railroads, steam navigation, canals, telegraphs, and telephones. It is known as the Shuman report, as it was signed Armin E. Shuman, Expert.

In 1886, the Senate's Select committee on interstate commerce held hearings and published them together with its report. It was 49th Cong., 1st sess. Senate report no. 46, and is usually known as the Cullom Report, because Senator Shelby M. Cullom was Chairman of the select committee.

The next year, 1887, an Act to regulate commerce, was approved on February 4. It was Public No. 41, establishing regulation of railroads

through the Interstate Commerce Commission. It is now known as the Interstate Commerce Act, which, with its amendments is published by the Interstate Commerce Commission, and also in the compilations of Elmer Lewis, superintendent, Document Room, House of Representatives. In the latest that appeared this year, the title of the compilation is Laws relating to Interstate and foreign commerce, and the Interstate Commerce Act is in section 1, Railroads.

In 1887 and 1888, the Pacific Railway commission took testimony and of course issued a report. The testimony and report are printed in 10 volumes, made up into 5, with plates and maps so far not discovered by interior decorators, as 50th Cong. 1st sess. Senate Ex. doc. no. 51 in vol. 2-6. The title varies.

From 1887 to the present, there have been the publications of the Interstate Commerce Commission—annual reports, decisions, special reports, and the like. The first annual report was dated Dec. 1, 1887, the 50th will cover 1936 and will appear shortly.

From 1889 to the present, the Bureau of Statistics of the Interstate Commerce Commission has issued its annual report on the statistics of railways in the United States. The volumes were octavo from 1889 to and including 1911, and quarto since. From the color of their binding they are known as the ICC "Blue Books." 1935 is still in press. It is hoped for early next year. Henry Carter Adams was the first statistician. Dr. Max O. Lorenz is statistician now. Besides the Blue Books the Bureau of Statistics issued many other statistical publications. Its New Types of Light-Weight Passenger Trains, issued as its Statement No. 3639, May 1936, shows in mimeographed tables, names of trains, cost, weight, type, manufacture and other details, is a help in answering questions on streamliners and other recent passenger trains.

In 1890, the Census Office borrowed Mr. Adams from the Interstate Commerce Commission to make the Reports on transportation business in the United States at the 11th census, 1890, which were published in 2 quarto volumes, and also as 52d Cong., 1st sess. House. Miscellaneous doc. no. 340, part 21.

In 1900 Volumes 4 and 9 of the Industrial commission's report dealt with transportation, while Vol. 6, Distribution and marketing of farm products, included data on rates on agricultural products.

In 1905, the Bureau of the Census issued *Commercial Valuation of Railway operating property in the United States: 1904,* as its Bulletin 21. This was summarized in the 19th annual report of the Interstate Commerce Commission, 1905.

The same year, 1905, the Senate Committee on interstate and foreign commerce held hearings on regulation of railway rates. As a matter of exactitude the hearings began on December 16, 1904, and lasted until May 23, 1905. They were published in 5 volumes and are popularly known as the "Hepburn committee hearings of 1905" because Senator William Hepburn was chairman of the committee.

If one asks simply for the Hepburn committee hearings, without specifying dates or which Hepburn committee, one might get another Hepburn committee hearings. These were the *Proceedings of the New*

York (State) Legislative Assembly's Special committee on railroads, which held hearings in 1879 and 1880. A. Barton Hepburn was chairman of that committee, the proceedings of which were published in 6 vols.

In 1911, the U. S. Railroad securities commission, of which Arthur T. Hadley was chairman held its "proceedings." These are available only as a typewritten stenographic report, of which our Library has one of the few copies issued. The report of this commission, which has gone down in history as the Hadley commission was printed as 62d Cong., 2d sess. House doc. no. 256, and also in an edition without document series note.

In 1911, also, the U. S. Commerce Court, issued its Rules . . . "printed in temporary form for the guidance of counsel and others concerned." The opinions of this court, handed down during its short existence, from February 1911 to December 1913, were printed in a 739-page volume. On page 3 of this volume, the list of judges of the Commerce Court "during the time of these opinions" is a help to those making a survey of railroad regulation.

From 1916 to 1918, the Joint committee on interstate and foreign commerce of the U. S. Cong., held hearings which were printed in 2 vols. This joint committee is frequently referred to as the Newlands committee, because Senator Newlands was chairman to the time of his death late in 1917.

On December 26, 1917, President Wilson's *Proclamation* taking control of systems of transportation, was issued. This is reprinted in Bulletin 4, revised, of the U. S. Railroad administration, which administered the "systems of transportation" taken over.

From 1917 to the present, the Railroad Administration issued publications. During the period of Federal control, numerous reports, statements, circulars, and the like were issued. The most complete set is in the Library of the Bureau. Less complete sets are in Library of Congress, Interstate Commerce Commission Library and the storage rooms of the U. S. Railroad Administration, the USRA index is in this Library, so that when a question comes up that cannot be answered by our files, which are bound, we can find which file in those USRA files some data is located, and make the trip to the Treasury Dept. store rooms, where the USRA files are located.

Annual reports are the only publications issued since the end of Federal control. In his report for 1924, the Director-general wrote: ". . . This report is in effect final as to the adjustments made with those carriers whose property was actually taken over and operated by the Government during the period of Federal control . . ."

From 1918 to 1920, the House and Senate Committees held hearings on "railroad policy."

On December 24, 1919, President Wilson issued the "*Proclamation —Relinquishment of railroads and systems of transportation.*" This was effective on March 1, 1920.

On February 28, 1920, the Transportation Act, 1920, passed by the 66th Congress, and published as Public no. 152 of that Congress became effective. This was printed, of course, in the Interstate Commerce Commission's Interstate Commerce Act, as amended.

On March 19, 1929, Commissioner Clyde B. Aitchison, of the Interstate Commerce Commission, delivered as the Cyrus Fogg Brackett foundation lecture at Princeton University, his now-famous "*Organization and manner of work of the Interstate Commerce Commission.*" This was reprinted as 71st Cong., 1st sess. Senate Doc. No. 8.

Beginning in 1930, and continuing as long as may be necessary, "*Interstate commerce acts annotated . . .* " has been printed as 70th Cong., 1st sess. Senate doc. no. 166, 7 volumes have been issued so far.

From 1933 to 1936, the U. S. Federal coordinator of transportation issued his reports, studies, statements, and other material. Over 470 items have been issued so far. Some are mimeographed, some printed—and the two reports issued as 73d Cong. 2d sess. Senate documents nos. 119 and 152 are already in the "rare" document class—while others are planographed.

The Emergency Railroad Transportation Act of 1933, which established the office of Federal Coordinator, was Public no. 68 of the 73d Cong. This act expired last summer. The Coordinator's office had several reports and studies under way when the act expired, which are being published with funds supplied by the Association of American Railroads, and the American Short Line RR Association. Complete sets of the Coordinator's material are in the Bureau Library, the Library of the Interstate commerce commission, and in the office of Commissioner Eastman who was the Federal coordinator.

These are the "high-lights." The complete list will be a long, long one. When it comes to state documents relating to railroad transportation, the California laws of 1862 have been mentioned. Another state document, published in Carson City, Nevada, in 1885, and now in the rare, high-priced document class, should be mentioned. It is Nevada. Legislature. Senate. Committee on railroads: *Evidence concerning projected railways across the Sierra Nevada mountains, from Pacific tidewaters in California . . . . together with statements concerning present and prospective railroad enterprises in the state of Nevada,* procured by the Committee on railroads of the first Nevada Legislature. The latest price for this scarce item was $115. The highest price obtained for it so far was $300 in 1929. Our copy, purchased long ago, cost a little over $2.00.

Now, it gives me pleasure to introduce Mr. Jenkins of the Public Relations Dept. of the Association of American Railroads, who will show the Vocafilm, "All Aboard"—which was prepared for employees of railroads but is attracting interest as well of groups outside the railroad employees circles.

Letters to the Editor

I have recently received, and read with a great deal of interest, Bulletin No. 32, page 69—"The Evanston Branch of the Chicago, Milwaukee, St. Paul & Pacific Railroad," by Mr. Hugh G. Boutell.

As I have travelled many hundred of miles on a part of this branch line, during the past ten years, in going to and from my work, I would like to tell you and our Society something about the line as it is to-day.

This Branch is still entirely owned by the Chicago Milwaukee St. Paul & Pacific Railroad, and is operated by them for local freight service only between Fulton Street in down-town Chicago, where the branch connects with the main stem of the Milwaukee Road, to Buena Park (Irving Park Boulevard) Chicago, in the central northeast part of the City. The branch is of considerable importance to the Milwaukee Road as it serves quite a number of factories and coal yards. In this territory the line is built at ground level, with two main tracks, dirt ballasted. However, in many places there is a four track right of way, as paralleling the two main tracks are two leads that connect with various industrial stubs.

At Buena Park there is a small freight yard consisting of but three tracks, and here the operations of the Milwaukee Road terminate. This yard is electrified with simple cord type catenary, and acts as an interchange point between the Milwaukee Road, the Chicago North Shore & Milwaukee Railroad and the Chicago Rapid Transit Company. The Chicago North Shore & Milwaukee Railroad is a high class electric interurban line, while the Chicago Rapid Transit Company operates the elevated train service in Chicago and several suburbs.

At the old Buena Park Station of the Milwaukee Road, (one City block north of Irving Park Boulevard) the line becomes single track, and rises above street level on an earth fill, steel bridge, and concrete trestle, and continues thus to Lawrence Avenue Chicago, about one quarter mile from Buena Park Station. At Lawrence Avenue the line becomes four tracked.

From Buena Park to the end of the Branch, the line is leased to the Chicago, North Shore & Milwaukee Railroad, and from Lawrence Avenue to the end of the line (Linden Street) Wilmette, it is subleased under a trackage rights agreement to the Chicago Rapid Transit Company.

The four tracks extend as far as Howard Street, north side City Limits of Chicago, and all tracks are electrified with unprotected top contact third rails, except the western most track, which above Granville Avenue is electrified with simple inclined catenary only.

The line is built on an earth embankment, held in place by concrete retaining walls, which extend up to the track level. The tracks are ballasted with a good grade of gravel, and the rails are 85 and 90 pounds.

The two outside tracks are used by the Chicago North Shore & Milwaukee Railroad all the way to Howard Street, and by Chicago Rapid Transit express trains as far as Granville Avenue. The two inner tracks are used by Chicago Rapid Transit Trains making local stops, and after 10:30 P. M. the south-bound inner track is used by local and express

Chicago Rapid Transit trains and also by the Chicago North Shore & Milwaukee Railroad. (The reason will be given later). The center tracks are served by island platforms. Above Granville Avenue, the Chicago Rapid Transit trains use the inner tracks only.

The south-bound express track (the track further west) is gauntleted the entire distance from Granville Avenue to Lawrence Avenue. This gauntlet is used by freight trains only and connects with several coal yards along the west side of the line. This local freight service is performed by the Chicago Rapid Transit Company, by contract with the Milwaukee Road. This service is performed with two small, but very powerful electric locomotives. The gauntlet is fed from a simple catenary.

After 10:30 P. M. this south-bound express track is closed to passenger trains, to allow the handling of freight trains.

At Howard Street, the line becomes two tracked, and continues thus to its terminus at Linden Street, Willmette, Illinois. From Howard Street northward the line is electrified with simple trolley wire, and gauntlets are provided at each station to permit freight trains to pass the station platforms, as the rolling stock of the Chicago North Shore & Milwaukee Railroad and the Chicago Rapid Transit Company is not of standard width.

The part of the line from Church Street Evanston (near Davis Street) northward to near Isabella Street Evanston, has recently been elevated, and has been made wide enough to accommodate four tracks. However, only two are in service at present.

Linden Street, Wilmette is immediately across the border line between Evanston and Wilmette, and here the branch absolutely ends—never went any further. (From the article written by Mr. Boutell, one might surmise that it went further on, but it certainly never did). At Linden Street the service of the Chicago Rapid Transit Company terminates, while the Chicago North Shore & Milwaukee Railroad proceeds over its own tracks, which are here laid in the street.

Before closing I would like to mention that the tracks (three) of the Chicago & North Western Railway are completely elevated through Evanston, and come to ground level in Wilmette. The tracks of the Evanston Branch of the Milwaukee Road come to ground level again at Isabella Street Evanston.

I am enclosing herewith a map of the Chicago Rapid Transit System, from which you can see the part of the Evanston Branch of the Milwaukee Road over which they operate—Lawrence Avenue to Linden Street. This is the most profitable part of the entire Chicago Rapid Transit System.

Trusting that the above information will be of some value to the Society, I remain,

Very truly yours,

RAYMOND COLUMBE, Chicago Chapter.

New Books

MATHEW BOULTON, By H. W. Dickinson, 232 pages, 9½x6 with 15 plates. Bound in cloth. Published by The University Press, Cambridge and The Macmillan Co., New York, N. Y. Price $4.50.

The life of Mathew Boulton, partner of James Watt, has been very interestingly recounted in this recent publication. Mr. Dickinson, while preparing the biography of James Watt, which was published last year, decided to do justice to his partner and we are glad this biography has appeared on this interesting character.

Mathew Boulton, born in Birmingham in 1728 was the son of a "Toy" maker. The term "toys" of the eighteenth century meant the manufacture of buckles, fancy boxes, snuffers, watch chains, etc. Apprenticed to his father, he is credited with the invention of a new type of inlaid buckle, thus showing a talent for design. Upon inheriting the business he commenced the manufacture of steel jewelry, Sheffield and other plate and ormulu, an industry that brought him little money but everlasting reputation of quality production.

Through a somewhat complicated marriage he acquired a fortune. This might have entitled him to retire and live the easy life of a country gentleman. Instead, he founded the great Soho manufactory. Shortage of water power for his factory caused him to seek other sources of power and in this wise he met James Watt. Thus came a partnership which produced the Cornish mining engine, the early mill drives, the rotative steam engine and so was opened the way for the machine age.

It is doubtful if Watt, in spite of his capabilities, would have made a success of his engine had it not been for Mathew Boulton. Watt was diffident and retiring and needed someone to urge him on. Mathew Boulton furnished the necessary force to spur him on to greater efforts. Although associated with James Watt, this alone was not Boulton's only claim to fame. He was a craftsman of great artistic ability, a genius for industrial organization and a public-spirited citizen of Birmingham to which it owes some of its present greatness.

Mr. Dickinson has not only presented an interesting biography of one of England's early manufacturers but given the reader a good picture of industrial conditions in the eighteenth century. The book is the first devoted to Mathew Boulton and our readers will find it of genuine interest and worthy of their attention.

HISTORY OF THE DOMINION ATLANTIC RAILWAY. By Marguerite Woodworth. 159 pages, 9 by 6 with 16 pages of illustrations.. Printed by the Kentville Publishing Co. Ltd., for the Dominion Atlantic Ry. Price $1.50.

It is with great satisfaction that the Dominion Atlantic Railway has gathered together and allowed the author to write not only the history of this road but to give us an idea of the conditions in Nova

Scotia prior to the construction of the Nova Scotia Ry. It is to be expected that a population that lived along the seacoast and interested in fishing and maritime affairs would scarcely be interested in railroad construction. The hard work and energy displayed by the pioneers of the Nova Scotia and Windsor Branch roads are carefully set forth. The construction of the Windsor & Annapolis Ry., only to be nearly destroyed by the terrible Saxby Gale portrays some of the difficulties of railroad building in that province. The completion of the Cornwallis Valley Ry. furnished the last link to connect Yarmouth with Annapolis in 1891 and four years later we find the birth of the present system—the Dominion Atlantic Ry.

The history of this little road is well told and our members will find this book of interest and value. Today, the road is a subsidiary of the Canadian Pacific Railway but from the outset, through the bitter period of construction and finance, through the operation of their steamers to the present date, the author has added another worthy chapter of railway history.

Copies of this work can be procured only from the road and those of our members who desire copies should address their letter including the cost of the book to Mr. G. E. Graham, Vice President and General Manager, Dominion Atlantic Ry., Kentville, Nova Scotia, Canada.

Early Types of Illinois Central Locomotives and Illinois Central Locomotives. Within the past few months the Illinois Central R. R. has issued two illustrated sheets captioned as above. The former contains seven illustrations of early I. C. locomotives, three of the 4-4-0, one 2-6-0, one 4-6-0 and two of the 2-8-0 types. The latter sheet contains eight illustrations of the various types of locomotives used to handle the I. C. trains today. This is a new departure in railroad publicity and copies are furnished gratis. Application for either or both of these sheets should be made to Mr. George M. Crowson, Ass't to the President, Illinois Central R. R., Central Station, Chicago, Ill.

Historic Railroads. By Rupert Sargent Holland. 343 pages, 9½ by 7 with 61 illustrations including six colored pages. Published by Grossett & Dunlap, Inc., 1140 Broadway, New York. Price $1.00.

This book is divided into seven parts in which the author briefly traces the building and development of the railway on both continents. The author devotes seven chapters to the birth of the railway in England, the work of George Stephenson, the Stockton & Darlington and Liverpool & Manchester railroads, concluding with the Midland Railway and the "Battle of the Gauges."

Fourteen chapters are devoted to the roads of North America including such early locomotives as the "Stourbridge Lion," "Tom Thumb," "DeWitt Clinton" and "John Bull." Roads in the east are briefly touched on and there is a lengthy account of the completion of the first transcontinental line. Parts of a chapter are devoted to the roads of the

southwest and northwest and a chapter is devoted to Andrew's Raid of Civil War fame. Two chapters are devoted to the Canadian roads and chapters entitled "Unique Achievements," "Trains and Tracks," conclude this portion.

Two chapters are devoted to the South American roads, the building of the Trans-Andean line and the La Doranda Ry. Three chapters are devoted to the European railways, one to the Scandinavian roads, another to the railroads of Switzerland and the last is entitled "International Roads." The final portions of the book treat of some of the roads in Asia, Africa and the Far East.

The author has treated this subject in a broad and comprehensive way without entering into the many details and ramifications of this complex subject. The book is bound to be of interest to anyone who desires a general knowledge on this subject.

REORGANIZATION OF THE MOTIVE POWER DEPARTMENT OF THE LONDON, MIDLAND & SCOTTISH RAILWAY. Reprinted from *The Railway Gazette*, 33 Tothill St., S. W. 1, London, England. Price 5 shillings.

As the majority of our readers know, the London, Midland & Scottish Ry. was formed in 1923 of a consolidation of 35 railroad companies. The task of co-ordinating these different companies with their various standards to one that could be operated with some degree of economy was due to the efforts of Mr. E. J. H. Lemmon, Vice President for Railway Traffic Operating and Commercial Departments.

The work treats solely of the locomotive side of the picture. From 1923 to 1936 the company spent £16,000,000 on new and improved locomotives. In this same period the number of types of locomotives was reduced from 393 to 173 with a further reduction to 136 in the 1937 program. Standards were set up for motive power terminals in order to facilitate the prompt despatching of locomotives. From 1923 to 1936 the number of locomotives was reduced by 2705 with a consequent increase in daily mileage and hours in service of the locomotive. The illustrations are very interesting and the tables and charts illuminating. It tells of a well conceived plan of co-ordination of facilities with a view of reduction of expenses, something we are all interested in in America.

THE CHALLENGE. Published by the Roy L. Johnson Co., Randolph, Vermont. Price 50 cents.

This twenty-seven page booklet, published in 1928, describes vividly the damage done by the flood waters in the upper White River Valley and the damage and reconstruction of the White River Railroad. Although this railroad has since been abandoned, there is a brief history of the road in addition to the account of the 1927 flood. The work is illustrated and to those of our members who are interested in the history of these short lines we commend to them this little work. The publisher advises he has only a limited number of copies on hand and orders should be addressed to him for copies.

Karl E. Schlachter

It is with profound regret and with genuine sorrow that we note the passing, on May 25, 1937, of our member and friend—KARL E. SCHLACHTER. Born in New York, July 7th, 1885, he graduated from Columbia University as a Civil Engineer in 1905. Until 1912 he was engaged in various engineering projects and in that year entered the service of the United States Geological Survey. In 1916 he resigned from this service and took up Industrial Engineering. This work kept him from home so much of the time that he gave that up and in 1920 he engaged in the real estate and general insurance business in Piermont, N. Y. until the time of his death.

To some of our members Karl Schlachter may remain ever a myth but to the older group of collectors that were engaged in the exchange of locomotive photographs before this Society was ever started he was always ranked as A Number One. Like most normal boys his favorite toy was a cast iron locomotive. Unlike most of them, he preserved his first one. At the age of twelve, 1899, he commenced the hobby of taking photographs of locomotives and for thirty-eight years his camera was his constant companion in all of his travels. His photographs were uniformly good, showing detail, brought out by the use of a tripod and his prints, always accompanied with detailed information, were highly prized. In this respect his views coincided with others, that a print, no matter how well the picture is taken is worthless unless it is accompanied by information that will identify the subject.

Always interested in the specialties of others and how he could serve them from his large collection, his collection must have grown apace. One thing is certain however, he always respected the rights and wishes of others in the matter of their prints and in the majority of instances the others did the same by him. It can be truthfully said that the coming generation of picture collectors would do well to pattern after the method of Karl E. Schlachter not only in his photography but in his exchanges as well.

With the formation of this Society in 1921, Mr. Schlachter was one of our earliest members. He was actively associated with our New York Chapter and at the time of his death was one of its Directors. He took a lively interest on the various trips operated out of New York and was always ready with any of his material for the use of the Chapter or the Society.

To his wife and family we offer them all our sincere sympathy in the loss of their husband and father. It is the understanding by many that his son, Karl Jr. will try and carry on in much the same way as his father. If such is the case and he has our earnest hope that he will, your Editor expresses the wish that every one of our members who is interested in the exchange of photographs will try and treat this young man in the same way that his father treated those of us who began our photographic exchange nearly thirty years ago.

R. & L. H. S. Negatives

The Society has acquired the following negatives:

A- 66	Florida East Coast	101	4-6-2	Schenectady	1920
E-224	Chicago R. I. & Pacific	2014	2-8-0	Brooks	1910
E-225	Chicago Burlington & Quincy	1684	0-6-0	W Burlington	1905
E-226	Chicago Milwaukee St. P. & P.	5937		Gas-Electric	
E-227	New York Chicago & St. Louis	166	4-6-2	Brooks	1913
E-228	Illinois Central	2450	4-8-2	Lima	1924
E-229	Illinois Central	1860	2-8-2	Lima	1918
E-230	Illinois Central	1503	2-8-2	Baldwin	1914
E-231	Illinois Central	1620	2-8-2	Baldwin	1911
E-232	Chicago & North-Western	1546	4-6-2	Schenectady	1910
E-233	Illinois Central	1033	4-6-2	Schenectady	1906

Series A—Size 3¼x4¼ and Series E—Size 3¼x5½.

Price of Prints—10c Each.

Orders should be addressed to Mr. Harold S. Walker, Ass't Secretary, P. O. Box #65, Beach Bluff, Mass.

In Memory of

Phillips Barry

5 Craigie Circle

Cambridge, Massachusetts

Who Died on August 29th, 1937

and

Hal S. Ray

Director of Personnel & Public Relations

Chicago, Rock Island & Pacific Ry.

La Salle St. Station

Chicago, Illinois

Who Died on August 22nd, 1937.